CBS Confident Pharmacy Series

Second Edition

Social Pharmacy

for First Year Diploma in Pharmacy

Course Code: ER20-15T

As per the latest syllabus prescribed by Pharmacy Council of India

Including
Board Examination Question Papers and Specimen Answer Papers

VN Raje





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Salient Features

- Lucid and easy language
- To the point answers
- Remembering the concepts in the simplest way
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Preface to the Second Edition

Second edition of this book includes Board Examination Question Papers and Solved Specimen Answer Papers. These additional contents are of great importance to the students which give an exact idea about the framework of question paper pattern and specimen answers as per the examination format given by Pharmacy Council of India (PCI ER-2020).

This new edition of the book builds self-confidence in students which helps to get success in the examinations. The book has been written to meet the requirements of students of Diploma in Pharmacy (D Pharm) in accordance with the new revised syllabus ER-2020 prescribed by Pharmacy Council of India.

This book is small and humble effort has been put in for compiling necessary information on the subject. An attempt has been made to demystify and simplify the basic concepts for the students of pharmacy and to enable them get an evergreen success in all the board examinations.

The salient features of the present book are:

- Lucid and easy language
- To the point answers
- Remembering facts in the simplest way and
- Infusing confidence in the reader to appear in the board examinations.

Hence the series is named

CBS Confident Pharmacy Series

I am confident that this book will be useful to both the students and the teachers of Diploma in Pharmacy as well as the candidates desiring to succeed in competitive examinations for better job opportunities in pharmacy profession such as hospital pharmacists in PHCs, civil hospitals, etc.

Raje Vijay N

to

my beloved family

Acknowledgements

I express my heartfelt thanks to Prof Madan Jagtap, Chairman, Gourishankar Education Society, Satara Maharashtra, for consistent encouragement and inspiration for writing this book.

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I am also thankful to Shri Satish Kumar Jain, Chairman and Managing Director, and Shri Shantanu Sarkar, General Manager, Mumbai Branch, CBS Publishers & Distributors Pvt Ltd, for their sustained efforts and keen interest in the publication of this book.

I wish all my beloved students to have a great success in the board examinations.

Raje Vijay N

Syllabus

(As per ER 2020, Course)

Social Pharmacy (Theory)

1. Introduction to Social Pharmacy

- Definition and Scope. Social pharmacy as a discipline and its scope in improving the public health. Role of pharmacists in public health.
- Concept of health—WHO definition, various dimensions, determinants, and health indicators.
- National Health Policy–Indian perspective
- Public and private health system in India, National Health Mission.
- Introduction to Millennium development goals, sustainable development goals, FIP development goals

2. Preventive Healthcare—Role of Pharmacists in the following

- Demography and family planning
- Mother and child health, importance of breastfeeding, ill effects of infant milk substitutes and bottle feeding
- Overview of vaccines, types of immunity and immunization
- Effect of environment on health—water pollution, importance of safe drinking water, waterborne diseases, air pollution, noise pollution, sewage and solid waste disposal, occupational illnesses, environmental pollution due to pharmaceuticals
- Psychosocial pharmacy: Drugs of misuse and abuse—psychotropics, narcotics, alcohol, tobacco products. Social impact of these habits on social health and productivity and suicidal behaviours.

3. Nutrition and Health

- Basics of nutrition—macronutrients and micronutrients
- Importance of water and fibres in diet
- Balanced diet, malnutrition, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, fortification of food
- Introduction to food safety, adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods

- Dietary supplements, nutraceuticals, food supplements—indications, benefits, drug–food interactions.

4. Introduction to Microbiology and Common Microorganisms

Epidemiology: Introduction to epidemiology, and its applications. Understanding of terms such as epidemic, pandemic, endemic, mode of transmission, outbreak, quarantine, isolation, incubation period, contact tracing, morbidity, mortality.

Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicable diseases:

- Respiratory infections—chickenpox, measles, rubella, mumps, influenza (including Avian Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebolar
- Intestinal infections—poliomyelitis, viral hepatitis, cholera, acute diarrheal diseases, typhoid, amebiasis, worm infestations, food poisoning.
- Arthropod-borne infections—dengue, malaria, filariasis and, chikungunya
- Surface infections—trachoma, tetanus, leprosy.
- STDs, HIV/AIDS

5. Introduction to health systems and **all ongoing national health programs** in India, their objectives, functioning, outcome, and the role of pharmacists.

6. **Pharmacoeconomics:** Introduction, basic terminologies, importance of pharmacoeconomics

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Chapter 1

Introduction

A Introduction to Social Pharmacy
B Concept of Health

A

Introduction to Social Pharmacy

1 What is social pharmacy? Explain how social pharmacy helps in improving the public health. (S. 23, 24)

☞ **Social Pharmacy**

Definition:

- "Social pharmacy is defined as science which deals with social aspects of the profession of pharmacy".
- "Social pharmacy is the multidisciplinary field of education and research that focuses on the role, provision, regulation and use of medicines in the society."
- "Social pharmacy may be defined as the discipline dealing with the role of medicines from social, scientific and humanistic approach."

☞ **Scope of Social Pharmacy/Role of Social Pharmacy in Improving the Public Health**

1. It covers the social, psycho-social, economic and organizational aspects of the medicines.
2. Social pharmacy enables the pharmacy profession to act and take responsibility in its full scope with the problems of pharmacy and medicines in the society.
3. Social pharmacy can assist anyone who wants to use a scientific approach to describe, explain, understand and change practice.
4. Social pharmacy offers benefits to researchers, policy-makers and pharmacists as well as other healthcare providers.
5. Social pharmacy relates with the issues in public health and social politics.
6. Social pharmacy has a strong connections to pharmacy practice.
7. Social pharmacy research is helpful to investigate questions and themes concerning pharmacy practice and medicine use.

2 Explain/Describe the role of pharmacist in public health. (S. 23)

☞ **"Role of Pharmacist in Public Health:**

Pharmacy is an integral and essential part of healthcare system. The pharmacists are expected to perform the following roles of responsibilities for the public health:

1. He should maintain quality of medicines supplied to the patients.
2. He should record the incidence of a disease in their community.
3. He should identify the adverse drug reactions, if any and report to the authorities.
4. He should ensure that the supply of medicines is as per the laws.
5. He should ensure the medicines prescribed to the patients are suitable.
6. He should counsel the preventive aspects of various diseases to the patients.
7. He should advise the patients about how to take the medicines and answering the patient's questions with due care.
8. A pharmacist can be involved in the prevention and control of diseases in many ways, e.g. involvement in immunization programs, awareness programs, etc.
9. A pharmacist should be involved in the health education to the public regarding the topics such as exercise, health nutrition, tobacco cessation, deaddiction programmes, etc.
10. Pharmacist can work with other medical professionals to promote family planning programs, which is the today's need.

3 Write a note on "National Health Policy of India". (S. 22)

☞ **National Health Policy (NHP):**

- Health policy of a nation is its strategy for controlling and optimizing the social uses of its health knowledge of intended objectives.
- In 2015, the government has announced the health policy.
- It is the third policy announcement about health policy after 1983 and 2002.

☞ **Aims/Objectives/Goals of National Health Policy:**

1. To attain the highest level of health and well-being possible for every individual at any given age group.
2. The primary aim of the National Health Policy, 2015, is to inform, clarify, strengthen and prioritize the role of the government in shaping health systems in all its dimensions—

investment in health, organization and financing of healthcare services, prevention of diseases and promotion of good health through cross-sectional action, access to technologies, developing human resources, building the knowledge base required for better health, financial protection strategies and regulation, and legislation for health.

3. To achieve an acceptable standard of good health of the population.
4. To ensure a more equitable access to health service across the social and geographical areas.
5. To prevent the spread of diseases and improve health of the community.
6. To provide nutritional services, particularly for the underpriviledged sections.
7. It is aimed on preventive, promotive, public health and rehabilitation aspects of the healthcare.
8. To establish a dynamic health management information system to support health planning and health program implementation.

☞ The Salient Features of the National Health Policy (NHP), 2015 are Divided into 13 Sections:

1. Introduction.
2. Situation analysis.
3. Goals, principles and objectives.
4. Policy directions.
5. Human resources for health.
6. Financing of healthcare and engaging the private sector.
7. Regulatory framework.
8. Medical technologies.
9. Information and computer technology for health and health information needs.
10. Knowledge for health.
11. Governance.
12. Legal framework for healthcare and the right to health.
13. Concluding note—implementation framework and way forward.

☞ National Health Policy Identifies Co-ordinated Action on Priority Areas for Improving the Environment for Health:

1. **The Swachh Bharat Abhiyan:** To reduce water and vector-borne diseases and proper disposal of solid waste.
2. **Balanced and healthy diets:** To provide fresh cooked food at Anganwadi centres to reduce malnutrition and improved food safety.

3. **Deaddiction:** To reduce the use of tobacco, alcohol, gutka, etc. by the success of 'Nasha Mukti Abhiyan'.
4. **Yatri suraksha:** To control the deaths due to rail and road traffic accidents by taking preventive measures of road and rail safety.
5. **Nirbhaya Nari:** To enforce the stringent laws against gender violence.
6. **Reduced stress and improved safety:** Actions taken on the issues of employment security and preventive measures at workplace to reduce stress and improve safety.
7. **Control on air pollution:** To control indoor and outdoor air pollution by taking suitable actions.

4 Enlist various national disease control programmes (for communicable and non-communicable diseases).

☞ **National Disease Control Programmes:**

(a) **For Communicable Diseases:**
- (i) Integrated disease surveillance programme.
- (ii) The approach to integration.
- (iii) Control of tuberculosis.
- (iv) Control of HIV/AIDS.
- (v) Leprosy eradication.
- (vi) Vector-borne disease control.

(b) **Non-communicable diseases:**
- (i) Mental health.
- (ii) Emergency care and disaster management.
- (iii) Realizing the potential of AYUSH.

5 Write a note on Indian perspective of National Health Policy. Give the goals/objectives of National Health Policy (NHP), 2017.

☞ **National Health Policy, 2017:**

The latest National Health Policy (NHP) is effective from 2017.

• **The Major Goals of NHP, 2017:**

(i) To attain the highest possible level of health and well-being for all at all ages, through a preventive and promotive healthcare orientation in all developmental policies.

(ii) To increase accessibility, improving quality and lowering cost of healthcare delivery.

☞ The NHP Recognizes main Importance of Sustainable Developmental Goals (SDGs) Through Following Principles:

1. Professionalism, integrity and ethics.
2. Equity.
3. Affordability.
4. Universality.
5. Patient centered and quality care.
6. Accountability.
7. Inclusive partnerships.
8. Pluralism.
9. Decentralisation.
10. Dynamism and adaptiveness.

☞ Objectives of the National Health Policy, 2017:

The main objectives of NHP 2017 are:

(i) Progressively achieve universal health coverage.

(ii) Reinforcing trust in public healthcare.

(iii) Align the growth of private healthcare sector with public health goals.

(iv) Specific goals and objectives include:
- Health status and programme impact.
- Health systems performance.
- Health system strengthening.

(v) The NHP is integrated with following National Health Programmes:
- RMNCH + A services
- Child and adolescent health.
- Interventions to address malnutrition and micronutrient deficiencies.
- Universal immunization.
- Communicable diseases: Control of TB, control of AIDS, leprosy eradication, vector-borne disease control
- Non-communicable diseases: Mental health, population stabilization.

6 What are Millennium Development Goals (MDGs)? Enlist MDG. Give the objectives/importance of MDGs.

☞ Millennium Development Goals (MDGs):

- MDGs are the goals with measurable targets and clear deadlines for improving the lives of the world's poorest people.

- To meet these goals and eradicate poverty, leaders of 189 countries signed the historic millennium declaration at the United Nations Millennium Summit in 2000.
- The target date of achievement of the goals was identified as 2015.

The following eight goals were identified by MDG:

1. To eradicate extreme poverty and hunger.
2. To achieve universal primary education.
3. To promote gender equality and empower women.
4. To reduce child mortality.
5. To improve maternal health.
6. To combat HIV/AIDS, malaria and other diseases.
7. To ensure environmental sustainability.
8. To develop global partnership for development.

- Each goal has specific targets and dates for achieving those targets.
- The eight goals were measured by 21 targets.
- The MDG was succeeded by sustainable development goals (SDGs) in 2016.

7 What do you mean by sustainable development goals (SDGs)? Mention/enlist various 17 SDGs.

☞ **Sustainable Development Goals (SDGs):**

- The sustainable development goals (SDGs) are known as global goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet and ensure that by 2030, all people enjoy peace and prosperity.
- The heads of state and government and high representatives, in September 2015 at meeting in USA decided on sustainable development goals (SDGs).
- The 17 SDGs are integrated and they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability.
- SDGs or global goals are the collection of 17 interlinked global goals designed to be a "Blueprint to achieve a better and more sustainable future for all".

The 17 sustainable development goals (SDGs) are:

1. End poverty in all its forms everywhere.
2. End hunger, achieve food security and improve nutrition and promote sustainable agriculture.

3. Ensure healthy lives and promote well-being for all, at all ages.
4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. Achieve gender equality and empower all women and girls.
6. Ensure availability and sustainable management of water and sanitation for all.
7. Ensure access to affordable, reliable, sustainable and modern energy for all.
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
10. Reduce inequality within and among countries.
11. Make cities and human settlements inclusive, safe, resilient and sustainable.
12. Ensure sustainable consumption and production patterns.
13. Take urgent action to combat climate change and its impacts.
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

8 What do you mean by FIP? Give the FIP development goals. (S. 23, 24, W. 22)

☞ International Pharmaceutical Federation (FIP) Development Goals:

Definition of FIP:

- FIP is the Global Federation of National Associations of Pharmacists and Pharmaceutical Scientists.
- FIP, with its headquarter in the Netherlands, is an International Organization of pharmacy professionals.

- This framework can also be a basis for investment in pharmacy healthcare by government agencies and finding authorities and for national planning and delivery of policy initiatives.
- The FIP development goals are a key resource for transforming the pharmacy profession over the next decade globally, regionally and nationally.
- 21 FIP development goals have been identified and each one of them is marked with workforce (W), practice (P) and science (S) components.
- The work on FIP development goals started in 2016 and the final document has been provided in 2020.

The 21 FIP development goals are:

1. Academic capacity.
2. Early career training strategy.
3. Quality assurance.
4. Advanced and specialist development.
5. Competency development.
6. Leadership development.
7. Advancing integrated services.
8. Working with others.
9. Continuing professional development strategies.
10. Equity and equality.
11. Impact and outcomes.
12. Pharmacy intelligence.
13. Policy development.
14. Medicines expertise.
15. People-centered care.
16. Communicable diseases.
17. Antimicrobial stewardship.
18. Access to medicines, devices and services.
19. Patient safety.
20. Digital health.
21. Sustainability in pharmacy.

B

Concept of Health

1 Define the term "health". (S. 22, W. 22, 23)

☞ **According to World Health Organization (WHO) the Term Health is Defined as:**

"Health is a state of complete physical, mental and social well-being and not merely an absence of disease or infirmity."

2 Mention various dimensions/types/aspects of health. (W. 22, 23)

☞ **The Concept of Health Refers to Many Aspects or Dimensions such as:**

- Physical health or physical dimension.
- Mental health or mental dimension.
- Social health or social dimension.
- Spiritual health or spiritual dimension.
- Emotional health or emotional dimension.
- Vocational health or vocational dimension.

3 Describe in brief about physical health. (W. 22, 23)

☞ **Physical Health**

It is defined as "a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of the body".

- It refers to the perfect functioning of the body.
- It indicates that all body organs are structurally and functionally in a normal state and there is a perfect coordination between the organs and the systems.
- The signs of physical health in an individual are as follows:
  - A good complexion
  - Clean skin
  - Sound sleep
  - Regular activity of bowel and bladder

– Bright eyes	–	Smooth and easy coordinated movements
– Lustrous hair	–	Body weight, pulse rate, BP, etc. are all in normal limits
– Not too fat	–	A sweet breath
– Good appetite		

- The physical health can be assessed by clinical examination, nutrition and biomedical and laboratory investigations

4 What is mental health? State major types of mental disorders. (W. 22, 23)

☞ Mental Health

Mental health has been defined as "a state of balance between the individual and the surrounding world including environment and a state of harmony between oneself and others".

Types of Mental Disorders/Diseases

- Psychosis: It is the psychic condition which involves marked impairment of behaviour with a serious inability to think.
- Neurosis: This term is used to denote less severe form of psychosis.
- Schizophrenia: It is psychic condition characterized by disturbed thinking and emotional withdrawal from surrounding.
- Depression: It is a common psychiatric disorders characterized by a feeling of misery, apathy, hopelessness, ugliness, loss of appetite, insomnia, anorexia, alteration in moods and activities, etc.

5 Write a note on mental health.

☞ Mental Health:

"It is a state of balance between the individual and the surrounding world including environment and a state of harmony between oneself and others."

- Mental health refers to mind of the individual.
- It is always said that healthy mind resides in healthy body.
- Therefore, physical and mental components of health are indivisible.
- Mental health is an ability of individual to adjust with the environment and the surrounding world.

Characteristics/Signs of Mentally Healthy Person

- He is free from internal conflicts.
- He is well adjusted with surrounding.
- He searches for identity.
- He knows himself, his needs, problems and goals.
- He has a good self-control.
- He faces problems and tries to solve them intelligently.

6 Write a brief about "social health". (W. 22, 23)

☞ **Social Health**

It has been defined as "a quantity and quality of an individual interpersonalities and the extent of involvement with the community.

- Man is a social animal, he cannot live individually, he will have to depend on each other to fulfil his basic needs.
- Thus the social health implies harmony and integration within the individual and members of the society and the world in which they live.
- The social health considers the individual as a member of society and his health status in relation to socioeconomic conditions of the social group in which he lives.

7 Write a short note on "spiritual health/holistic health". (W. 22, 23)

☞ **Spiritual Health**

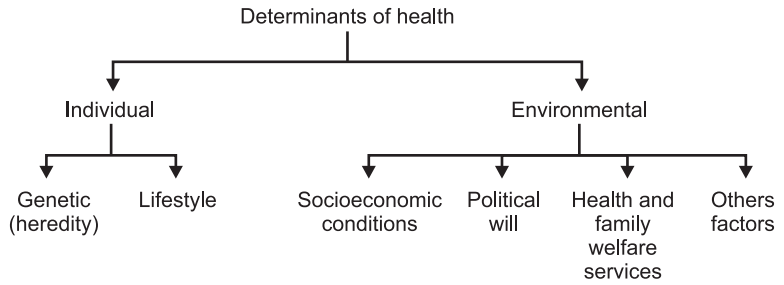
It is concerned with spirit or soul which directs the person towards right things and keeps away from bad habits.

- Spiritual health plays a role in health and disease.
- Spiritual health refers to that part of the individual which reaches out and strives from meaning and purpose in life.
- Spiritual health may determine or influence individual's physiology and psychology.
- The body is always guided by soul, if the spiritual health is sound, the bad thinking is always controlled by inner soul.
- All religions are concerned mainly about the spiritual welfare.
- Spiritual health is the supernatural power that contributes to the health of an individual.
- Spiritual component of health is necessary to follow the rules and regulations in daily life.
- To do prayers in the morning and evening is healthy sign of spiritual health.

8 Discuss various variables/determinants/factors which govern the health of an individual. (W. 23, S. 24)

☞ Determinants of Health

"The factors which influence the health of the individual and external environment or society where he lives are called determinants of health."



Individual

- *Genetic* (*heredity*): The state of health depends upon genetic constituent of man. Genes play a very important role in the health and development of child. Many diseases are hereditary, e.g. hemophilia and sickle cell anemia, diabetes occurs in the next generations which affect the health.
- *Lifestyle*: The lifestyle is the way people live. Lifestyle of an individual plays a great role in health. Many health problems are associated with lifestyle changes or personal habits such as smoking, alcoholism, etc. Some lifestyles can promote the health which include care of body, bathing, washing, care of teeth, hair, nail, adequate sleep, nutrition. Thus there is an association between health and lifestyle of an individual.

Environment/Surrounding Factors

- *Socioeconomic conditions*: These conditions influence human health. The economic status, purchasing power, education, occupation, family size, quality of life affect the health status of an individual in many ways.
- *Political will*: The health is also related to country's political system. A political system oriented towards social development promotes good health.

The poor people living in slums, lacking good hygienic conditions are the targets of disease agents. The people in rural areas who do not have access to health services should be taken into consideration while framing the health policies by the political parties because it ultimately affects the health status of these communities.

- *Health and family welfare services*: It covers personal and community services for the prevention, treatment of disease and promotion of health.

  The purpose of health services is to improve health status. It includes services like immunization, safe water supply, care of pregnant woman and children, treatment of sterility, framing "small family norm", etc. For these activities "primary health centres" are good places of operation.
- *Other factors*: Other factors contributing to the health-derived policies such as employment, opportunities, education, rural developments, etc.

9 What do you mean by "indicators of health"? Give the characteristics of an ideal indicator.

☞ **Indicators of Health**

Health indicators are the factors used to measure the health status of community as well as to find out how far a given person is healthy.

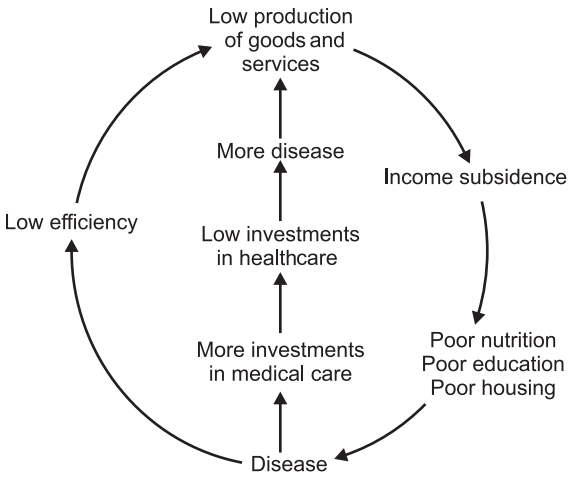
Characteristics of an Ideal Health Indicator

- It should be valid.
- It should be reliable.
- It should be sensitive.
- It should be specific.
- It should be feasible.
- It should be relevant.

10 Write a note on "economic cycle of disease".

☞ The health of an individual depends on the socioeconomic factors which are governed by set rules of regulations framed and accepted by the society in which he lives.

Therefore, poor economic status, poor nutrition, poor education, poor housing are major root causes of the diseases and affect health status of an individual.



Economic cycle of disease

11 Enlist various indicators of health (classify indicators of health). (S. 22)

☞ **Indicators of Health are Classified as:**

- Mortality indicators.
- Morbidity indicators.
- Disability indicators.
- Nutritional status indicators.
- Healthcare delivery indicators.
- Utilization indicators.
- Indicators of social and mental health.
- Environmental indicators.
- Socioeconomic indicators.
- Health policy indicators.
- Quality of life indicators.
- Other indicators such as sanitation indicator.

12 Write a note on mortality indicators (death rate). (S. 22)

- Mortality rate means death rate.
- Mortality rate of children of any country is the direct indicator for judging the state of development of the country.
- A high mortality rate of children in a country indicates that the country is undeveloped.
- Mortality indicators may be classified as:

i. *Crude death rate*: It is defined as number of deaths per 1000 population per year in a given community.
   – It indicates the rate at which the people are dying.
ii. *Expectation of life*: Expectancy of life at birth is the average number of years likely to be lived by a person if current age specific mortality rates are applied.
   – If the expectation of life increases it indicates improvement in the health status and socioeconomic development.
   – To achieve expectancy of life at birth, 60 years is the target for "health for all" by 2000 AD.
iii. *Infant mortality rate*: It is the rate of deaths under 1 year of age in a given year to total number of live birth in same year.
iv. *Child mortality rate*: It is defined as the number of deaths at ages 1–4 years in a given year per 1000 children in that age group.
v. *Maternal mortality rate*: It is the proportion of total deaths occurring in the women of reproductive age.

13 What do you mean by morbidity indicators? (S. 22)

☞ **Morbidity Indicators give Information Regarding the Disease Situations in the Community.**

- The morbidity rate (disease rate) is the number of cases of a disease found to occur in a stated number of population.
- Morbidity indicators are used for assessing ill-health in the community which is not judged by mortality indicators.
- Morbidity indicators include:
  i. Incidence and prevalence rate.
  ii. Epidemiological studies.
  iii. Admission, readmission and discharge rates in hospitals.
  iv. Stay duration in hospitals.
  v. Absence from school or work.
  vi. OPD attendance.

14 Write a note on "concept of disease".

☞ **The Term "Disease" is Defined by Many Ways:**

- Disease is a physiological or psychological dysfunction.
- Disease is any deviation from normal state of complete physical, mental or social well-being.

- Disease is a condition of the body or some part or organ of the body in which its functions are disturbed.
- The WHO has not defined the disease because disease has many shades (spectrum of disease) ranging from subclinical cases to severe illness.

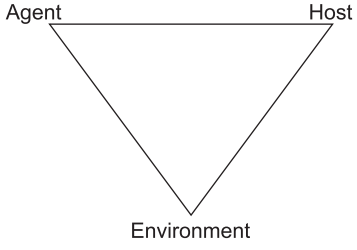
15 Write a note on "natural history of disease".

☞ The term natural history of disease signifies the way in which a disease evolves over time from the earliest stage of pathogenesis phase to its termination as recovery, disability or death in the absence of treatment or prevention.

Disease results from a complex interaction between person, an agent (disease agent) and the environment.

Natural history of disease consists of two phases:

i. *Prepathogenesis phase*: It is the phase at which causative agent exists in the environment. In this phase, the man is exposed to the risk of disease.
The causative factors of disease may be classified as agent, host and environment. These three factors are referred to as epidemiological triad.



Epidemiological triad

ii. *Pathogenesis phase*
- This phase starts with the entry of the agent into the human host.
- The time interval from the entry of agent in the host to the appearance of disease is termed incubation period.
- During this period the agent multiplies in the host's tissues without producing symptoms of disease.
- The incubation period is followed by pathological changes in the form of early and late pathogenesis.

16 Define the term "disease agent". Classify various disease agents.

☞ **Disease Agent**

Disease agent is a substance living or nonliving or a force tangible or intangible the excessive presence or relative lack of which is the immediate cause of a particular disease.

The disease agents are classified as:

i. *Biological agents*: These are micro-organisms including bacteria, viruses, fungi, protozoa.
ii. *Nutrient agents*: These include proteins, fats, carbohydrates, vitamins, minerals and water.
iii. *Physical agents*: These include heat, cold, humidity, radiation, electricity, pressure, sound.
iv. *Chemical agents*:
   – Endogenous, e.g. urea, bilirubin, uric acid, cholesterol.
   – Exogenous, e.g. pollens, fumes, gases, insecticides.
v. *Mechanical agents*: Vibration, chronic friction and other mechanical forces can lead to trauma.
vi. Absence or insufficiency or excess factors necessary for health may be the cause of disease, e.g. hormones, enzymes.
vii. *Social agents*: These include poverty, smoking, alcohol, unhealthy lifestyles.

17 Explain the "concepts of prevention of diseases".

☞ The concept of prevention of diseases includes following three levels:

Primary Prevention

Primary prevention can be defined as action taken prior to the onset of disease, which removes the possibility that disease will ever occur.

i. Primary prevention is exercised to promote general health and well-being and quality of life of the people.
ii. The concept of primary prevention is now being applied to the prevention of chronic disease like hypertension, cancer.
iii. Primary prevention is the safest and low cost way of prevention of disease.

Secondary Prevention

Secondary prevention can be defined as "actions which are taken to half the progress of a disease at its early stage and to prevent complications.

i. Secondary prevention arrests the disease process by early diagnosis and treatment.
ii. Secondary prevention is an important tool in the control of transmission of diseases.
iii. The health programs of government are usually at the level of secondary prevention.
iv. It is often more expensive and less effective than primary prevention.

Tertiary Prevention

Tertiary prevention can be defined as "all measures available to reduce or limit impairments and disabilities, minimise sufferings caused by existing departures from good health and to promote the patients adjustment to irremediable conditions".

Tertiary prevention includes disability prevention and rehabilitation of the patients.

18 What is intervention? What are various modes of intervention?

☞ Intervention

Any measure taken to intervene or interrupt the natural sequence of a disease is termed intervention.

Intervention includes treatment, education, help or social support.

The modes of intervention are:

i. *Health promotion*: Health promotion is intended to strengthen the host by improving the general health and quality of life of individual and communities.
   The important interventions for health promotion are:
   – Health education
   – Environmental modifications
   – Nutritional intervention
   – Lifestyle and behavioural changes.
ii. *Specific protection*: It includes specific immunization, use of specific nutrients, protection against accidents, etc.
iii. *Early diagnosis and treatment*: Early detection and treatment are the main interventions of disease control.
iv. *Disability limitation*: The objective at this level is to control the disease process by appropriate treatment to limit the disability and further complications.
   Disease → Impairment → Disability → Handicap

v. *Rehabilitation*: It is defined as "the combined and coordinated use of medical, social, educational and vocational measures for training and retraining the individual to the highest possible level of functional ability". The important areas of rehabilitation are as follows:

– Medical rehabilitation: Restoration of function.
– Vocational: Restoration of the capacity to earn a livelihood.
– Social: Restoration of family and social relationship.
– Psychological: Restoration of personal dignity and confidence.

19 Define the terms:

☞ (a) **Health education:** Health education is an educating the public in general, individually or in masses communicating information given by experts on health aspects, diseases, drug abuses, etc. so that people lead healthy life in all dimensions of human health as covered by WHO in the interest of public welfare.

(b) **Community pharmacy**: A community pharmacy is a healthcare facility that provide pharmaceutical services to the community and dispenses medicine and typically involves a role of pharmacists.

20 Define "indicators of health". Explain various indicators of health. (W. 22, 23)

☞ Indicators of Health

"Health indicators are the factors used to measure the health status of community as well as to find out how far a given person is healthy."

Assessing the health status of a community helps to:

(a) Identify the healthcare needs of society.
(b) Utilize, needs and success of available health services.
(c) Frame and implement better health policies to improve health status.

Following are the indicators of health:

1. **Mortality indicators:**
   - Mortality rate means death rate.
   - Mortality rates are the indirect measures of health.
   - Determining mortality rates in different age groups in a community, e.g. infant mortality, child mortality, maternal mortality indicate the health status of that community.

2. **Morbidity indicators:**
   - Morbidity indicators give information regarding the disease situations in the community.
   - The morbidity indicators include epidemiological studies that determine incidence and prevalence of disease and statistical data showing notification of disease, number of admissions in the hospital.
3. **Disability indicators:**
   - Disability means persons may remain disabled for sometime or lifelong on recovery from disease or illness.
   - Disability rates are determined from limitations of morbidity and limitations of activity.
4. **Healthcare delivery indicators:**
   - Doctors–population ratio, population–bed ratio, population–health center ratio are used as indicator of health.
   - Health services utilization may give the indication of health status.
5. **Sanitation indicators:**
   - The term sanitation covers care of food, water, disposal excreta and regulation of environment.
   - The percentage of population with safe water, and sanitary facilities and measurement of air, water and noise pollution are indicators used to measure health status.
6. **Socioeconomic indicators:**
   - The population growth rate, per capita income, level of unemployment, literacy rates, etc are indicators of socioeconomic health status of the community.
   - Social and mental health problems (e.g. suicide, violence, alcoholism, drug abuse) in a given community gives the indication about social and mental health.
7. **Quality of life indicators:**
   - Health status can be measured by describing the quality of life of the individual and whole community in which he lives.
   - Defining quality of life is difficult.
   - The physical quality of life can be determined from infant mortality, life expectancy at age one to five and literacy.

OBJECTIVE QUESTIONS WITH ANSWERS IN BOLD LETTERS

1. SDGs mean **Sustainable Development Goals**.
2. The time interval from the entry of agent in the host to the appearance of disease is termed as **incubation period**.
3. **Social pharmacy** is defined as the science which deals with social aspects of the profession of pharmacy.
4. The physiological functioning of the body is known as **physical health**.
5. MDGs stand for **Millennium Development Goals**.
6. The burden of disease is given by **promotional mortality rate**.
7. Nirbhaya Nari is a **National Health Policy**.
8. The **health indicators** are used to measure health status of the community.
9. **Health** is a state of being free from illness or injury
10. **Disease** is a disorder or bad functioning (malfunction of mind or body) which leads to departure of good health.
11. The hereditary **traits** means social relationship continued from the days of parents.
12. NHP stands for **National Health Policy**.
13. Death rate is defined as the number of deaths **per 1000 population**.
14. The **primary prevention** means action taken prior to the onset of disease.
15. The long form of WHO is **World Health Organization**.
16. National Health Policy in India was implemented in **2002**.
17. **Mortality indicators** give information regarding the disease situation in the community.
18. **Intervention** means interruption of the natural sequence of disease.
19. FIP means **International Pharmaceutical Federation**.
20. **Rehabilitation** is the process of returning to a healthy or good way of life.
21. The first goal of sustainable development is to **end poverty**.
22. Host, agent and environment is known as **"epidemiological triad"**.
23. Health promotional activities include **information, communication and education**.
24. India's largest National Health Protection scheme has been implemented under the scheme **Ayushman Bharat**.
25. Natural history of disease consist of two phases namely **pathogenesis and pre-pathogenesis**.

Chapter
2

Preventive Healthcare

A Demography and Family Planning
B Environment and Health
C Mother and Child Healthcare
D Overview of Vaccines and Immunity
E Psychosocial Pharmacy

A

Demography and Family Planning

1 Define "demography". Give the objectives of study of population.

☞ **Demography**

Demography is the scientific study of the human population.

Objectives of Demography

- To study the change in population size.
- To study the composition of population.
- To study the distribution of population in space.

2 Define demographic cycle. Explain stages of demographic cycle. (S. 24, W. 22)

☞ **Demographic Cycle**

"The cycle which suggests the population growth of nation is known as demographic cycle."

Five stages of demographic cycle are as follows:

i. *First stage* (*high stationary stage*)
   - It is the first stage through which nation begins.
   - At this stage birth rate is very high as well as death rate is also very high. Hence, there is no increase in population size.
   - India was in this stage up to 1920.

ii. *Second stage* (*early expanding stage*)
   - In this stage death rate was decreased while birth rate was not affected so the population started increasing.
   - In some countries birth rate was increased due to improved healthcare facilities.
   - Many African and Asian countries are passing through this stage.
   - As the population has started increasing this stage is also called 'early expanding stage'.

iii. *Third stage* (*late expanding stage*)
- In this stage death rate continues to fall and birth rate also started to decrease.
- Therefore, population continues to increase.
- Many developing countries like China, Singapore are in this stage.

iv. *Fourth stage* (*low stationary stage*)
- In this stage population is stabilized.
- The low death rate and low birth rate results in constant population (stable).
- It is also called zero population growth.

v. *Fifth stage* (*declining*)
- In this stage population decreases because birth rate is lower than death rate.

3 What is fertility? Explain factors affecting fertility.

☞ Fertility

Fertility means the actual bearing of children.

A woman's reproductive period is from 15 to 45 years.

Factors Affecting/Influencing Fertility

Factors on which fertility depends are:

- *Age of marriage*: Earlier the marriages, higher is the level of fertility. Females who are marrying later have fewer number of children.
- *Duration of married life*: All the efforts towards fertility control should be within 10–15 years of married life of the couple because the majority of births take place during this period.
- *Spacing of children*: Spacing methods are properly advised to females of 25–30 years to have fertility control.
- *Education:* Well-educated females give births to less number of children than uneducated females.
- *Economic status*: When economic condition of the family is good, more attention is given to control fertility.
- *Religions and caste*: Muslims and lower caste Hindus have comparatively higher fertility.
- *Nutrition*: All poorly fed communities have higher fertility rates.
- *Family planning*: It is the most important key factor in decreasing fertility in most of the developed countries.

- *Other factors*: Fertility is affected by the number of physical, social, biological and cultural factors such as value of children in society, breastfeeding, customs and beliefs, better health conditions and housing.

4 Write a note on Family Welfare Programme.

- The term 'family welfare' is now used in place of the 'family planning'.
- Family welfare signifies "the improvement of the quality of health and welfare of the entire family".
- Family welfare includes:
  i. Spacing and limitation of birth.
  ii. Advice on sterility.
  iii. Education of parenthood.
  iv. Sex education.
  v. Genetic counselling.
  vi. Carrying out pregnancy test.
  vii. Services to unmarried mothers.
  viii. Premarital examination and counselling.
  ix. Maternity and child health services.
  x. Immunisation service.
- Before 1970 the Family Welfare Programme advocated 2 to 3 children in a family.
- In 1980, they advocated only 2-child norms.
- In 1990, they say that whether daughter or son is enough.
- The department of family welfare has increased the interaction with state government for improving the quality of Family Welfare Programme.

Objectives of Family Welfare Programme

- Reduction in the number of children by only one in family shows remarkable effect on growth rate of whole country.
- It helps to promote on a voluntary basis for controlling number of children.
- To raise decision-making capabilities in taking care of their reproductive health, number of children.
- It helps to educate and to make awareness in the mothers to control the number of children in the family.

5 Write a note on population explosion/population problem in India. (S. 22)

☞ Population Problem/Population Explosion in India

India faces a serious population problem which is ever increasing. This is due to an increase in the birth rate and decrease in the death rate.

The death rate has decreased because of new inventions and better developments in the science and medicine. Hence most of the diseases can be cured, as a result, death rate decreases. Whereas birth rate has not decreased to keep a balance in the population. The increase in birth rate is due to child marriage mainly in rural areas. This may be due to lack of knowledge about the advantages of family planning.

Due to the population increase, the economy of the country does not show progress as all effects are concentrated on fighting against the poverty, due to this population increases. As a result, there is no progress in any other important field.

Therefore, it is necessary to control population increase by accepting family planning at a national level for the progress of our country.

The government of India has made family planning as a national policy.

6 Define the term "family planning". Give the objectives of family planning. (S. 23)

☞ Family Planning

Family planning means to decide "the number and timings of children in the family" in its simplest sense.

WHO defined family planning as "a way of living and thinking that is adopted voluntarily, upon the basis of knowledge, attitude and responsible decisions by individuals and couples in order to promote the health and welfare of the family group and thus contribute effectively to social development of a country".

Objectives/Importance/Advantages/Merits of Family Planning

- To avoid unwanted births.
- To bring about wanted births.
- To regulate the intervals between pregnancies.
- To control the time at which birth occurs in relation to ages of the parents.

- To determine the number of children in the family.
- To preserve the health of the mother, the welfare of the child and give happiness at home.
- To control the population problem.

7 Define contraceptives and contraception. Classify methods of contraception/family planning. (S. 23, W. 23)

☞ Contraceptives

Contraceptives are the devices which restrict the fertility of ovum and do not allow the zygote formation. Or the devices which prevent the entry of sperm into uterus of the female to prevent pregnancy.

Contraception

"The prevention of pregnancy or to plan the pregnancy by using contraceptive devices is called contraception."

Methods of Family Planning/Contraception

a. *Temporary Methods (Spacing Methods)*

i. Barrier methods
   - Physical methods:
     - Condom for male
     - Diaphragms, vaginal sponge for female.
   - Chemical methods: Foam tablets, creams, suppositories, jellies and pastes.

ii. Intrauterine devices (IUDs)
   - Medicated IUDs
   - Nonmedicated IUDs.

iii. Hormonal methods
   - Oral pills
   - Slow released preparations, e.g. vaginal rings, implants.

iv. Postconception methods
   - Menstrual regulation
   - Menstrual induction
   - Abortion.

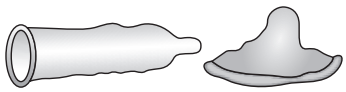
v. Natural methods (miscellaneous methods)
   - Abstinence
   - Coitus interruption
   - Safe period (rhythm method)
   - Cervical mucus method.

b. *Permanent Methods/Terminal Methods/Sterilization Methods*

i. Male sterilization (vasectomy)
ii. Female sterilization (tubectomy)
iii. Laparoscopy.

8 Explain physical method of contraception. Or Give the merits and demerits of (i) condom, (ii) diaphragm and caps.

☞ **Condom (Nirodh)**



- It is a commonly used contraceptive device by male all over the world.
- It prevents pregnancy by preventing the deposition of semen in vagina.
- The condom is fitted on the erect penis before intercourse.

Advantages

- Easy to use and easily available.
- They are cheap and no medical supervision required.
- They are safe, used to protect sexually transmitted diseases.
- No side effect.
- Light, compact, disposable.

Disadvantages

- May slip off or tear during coitus.
- May interfere the sexual enjoyment of sexual intercourse.
- It is not 100% efficient.
- It is used only once a time.
- Possible to burst the condom.
- Many men do not use them regularly and carefully.

Diaphragms and Caps

There are the vaginal barriers made up of synthetic rubber or plastic. These devices close off the entrance of womb. These are inserted into the vagina and are fixed on the cervix before intercourse and must remain in place for not less than 6 hours after sexual intercourse.

Advantages

- These are reliable.
- No risks and side effects.
- Do not interfere with sexual pleasure.
- They are easy to handle and cheap.

Disadvantages

- Initially training by physician is needed to learn insertion of diaphragm.
- It is difficult to determine the size which fits the woman well.
- It requires careful attention to wash it, dry it, store it and protect it.
- In some cases diaphragm may be pushed away by the penis.
- Some women have allergy to diaphragm and cap

9 Write a note on chemical method of contraception.

☞ Chemical Contraception

The purpose of using chemical contraceptives is to stop the sperms' progress completely or kill them before entering into the uterus of the female.

These contraceptives contain spermicide which kill the sperms.

i. *Foam tablets*: These are kept into vagina for 5 minutes before intercoitus. At body temperature they melt and produce a foam which acts as a barrier for the entry of sperms into uterus.

ii. *Paste and jellies*: These are pushed into vagina with the help of applicator called jelly applicator.

Sufficient time is to be given to spread the chemical on the mouth of the uterus.

iii. *Soluble tablets*: These are kept into vagina for 5 minutes before intercourse. At body temperature, they melt and spread the chemical on the mouth of uterus which kills the sperms.

Advantages of Chemical Contraceptives

- These are easy to obtain and simple to use.
- They are reliable and give good sexual satisfaction.
- Some chemicals also have lubricating action.

Disadvantages of Chemical Contraceptives

- High failure rates.
- Must be used immediately before intercourse.

- Some products can cause itching, burning and uneasiness.
- Some people do not like perfumes used in pastes and jellies.
- Foam tablets should be checked before use with the help of water.
- These devices should be used only once.
- Simple chemical barriers are not reliable, hence they must be used with physical barriers such as condoms, caps.

10 Write a note on IUCDs.

☞ Intrauterine Devices (IUDs) and Intrauterine Contraceptive Devices (IUCDs)

These are devices placed in the uterus of women for preventing the pregnancy. These are highly reliable. They prevent implantation of fertilized ovum in the uterus.

The various IUDs include (types):

i. First generation IUDs, e.g. Lippes loop.
ii. Second generation IUDs, e.g. Copper-T, Nova-T.
iii. Third generation IUDs, e.g. Progestasert.

i. **First generation IUDs:** They are inert, nonmedicated devices made-up of polyethylene or other polymers. They appear in various shapes and sizes like loops, spirals, coils, springs, etc.
Lippes loop is a commonly used device.
Lippes loop: It is a double S-shaped device having nylon thread attached to it. The S-shaped loop is lined by polyethylene plastic material.
It does not require hospitalization for insertion.
A nylon thread is connected to other end which projects into the vagina. The falling of threads into vagina assures that loop is in place properly.

Advantages of Lippes loop

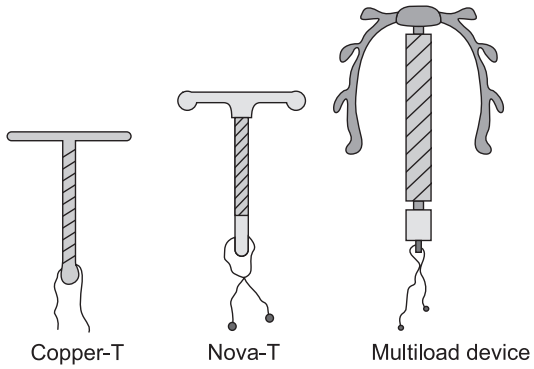
- Simple and easy insertion.
- Does not interfere with sexual pleasure.
- Cheap and safe.
- Reversible method.
- Can be used for a long time.



Disadvantages of Lippes loop

- Needs a trained person for insertion.
- Should be replaced periodically (2 years).
- Needs adequate follow-up.
- Rarely, it can produce cancer of uterus.

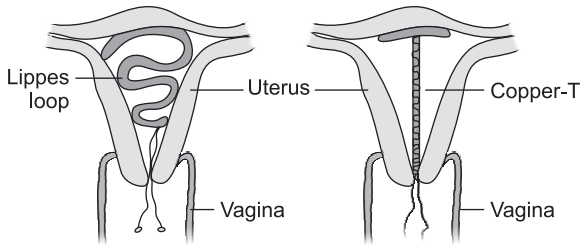
ii. **Second generation IUDs:** The second generation IUDs are copper-containing devices. Older devices are copper-T, copper-7, copper-T 200. Newer devices are Nova-T, multiload devices. Copper has antifertility effect. These devices release copper into uterus. Copper enhances cellular response in endometrium and alters the composition of cervical mucosa. The copper ions may affect sperm motility and survival.



Advantages of second generation IUDs

- Low expulsion rate.
- Lower incidence of side effects like pain and bleeding.
- Easy to fit.
- Increased contraceptive effects.
- Can be kept for a long time.

iii. **Third generation IUDs (hormone releasing IUDs):** These devices act by releasing a hormone in the uterus. The currently used device is 'Progestasert'. It is a T-shaped device filled progesterone, a natural hormone. It has a direct local effect on uterine lining, cervical mucus and sperms.



Complications and side effects of IUDs:

- Vaginal bleeding.
- Pain in pelvis.
- Pelvic infection.
- Uterine perforation by IUD.
- Pregnancy may occur in 3–5 per 100 IUD users per year.
- Ectopic pregnancy (pregnancy outside uterus).
- IUD may have expulsion tendency.

Advantages of IUDs

- It is safe and simple method.
- It is highly reliable.
- It will not interfere with sexual pleasure.
- It can be removed easily without any harm.
- It does not interfere with menstrual cycle.
- Insertion does not require hospitalization and requires only a few minutes.
- It is noncorrosive and nonirritant.
- It can be X-rayed to find its position.
- Once it is fitted, it is effective for years.
- Contraceptive effect is reversible.
- Free from systemic side effects.
- Highest acceptability.
- It does not affect the penis at the time of intercourse.

Disadvantages of IUDs

- It can produce heavy menstruation and pain in pelvis.
- It causes pains during insertion and after insertion.
- It may cause cramps and increased menstrual flow.
- Some women are unable to keep the IUD in place and can expel it out.

- It may cause side effects such as headache, bleeding from vagina, etc.
- It may cause cancer.
- It is not 100% efficient.

11 Write a note on hormone contraceptives/oral contraceptives.

☞ Hormonal Contraceptives/Oral Contraceptives (Pills)

- Hormonal contraceptives are chemical agents in the form of tablets.
- These tablets make the women unable to ovulate.
- These contraceptives are almost 100% effective if taken properly.
- These contraceptives contain a combination of both oestrogen and progesterone or progesterone only.
- In some packets, 28 pills are supplied.
- A woman has to take one pill per day starting from the 5th day of menstruation cycle.
- These pills prevent formation of matured ovum, i.e. prevent ovulation. Action may be due to formation of very thin endometrium, which is unable to grow fertilized ovum.
- Classification of hormonal contraceptives:

i. *Oral pills*
   - Combined pills
   - Progesterone only pill (POP)—minipills
   - Postcoital pill
   - Once a month pill
   - Male pill (under study).

ii. *Depot formulations* (slow released)
   - Injectable
   - Subcutaneous implants
   - Vaginal rings.

These hormonal contraceptives contain one or more different sex hormones.

i. *Oral pills*
   - Combined pills: Most of the combined pills contain oestrogen and progesterone.

The department of family welfare has made available two types of pills:

- Mala-N
- Mala-D

– Progesterone only pills (POPs): POPs contain only progesterone which is given in small doses throughout cycle.

ii. Depot formulations

– Injectable formulations, e.g. depot methoxy progesterone acetate (DMPA).

– Subcutaneous implants, e.g. silastic capsules are implanted in the skin of the forearm.

Advantages of hormonal/oral contraceptives

- It is simple and easy method.
- Effectiveness up to 100%.
- It is most reliable method.
- Once it is prescribed, it is not necessary to consult the doctor.
- It does not interfere with sexual pleasure.

Disadvantages of oral contraceptives

- These pills may cause side effects such as headache, pains in pelvis, unhealthy feeling and increase in body weight.
- Bleeding between the menstruation periods occurs.
- Nausea, breast tenderness.
- Increase in sugar and fat in blood.
- It may increase blood pressure.
- Pills may cause cancer.
- Reduced breast milk production.
- A woman has to take one pill per day starting from 5th day of menstruation.
- Pills should not be stopped between the days.
- Return to fertility may be developed.

12 Explain natural methods of family planning.

a. Abstinence

It is completely effective method but it is practically not possible to avoid the coitus by a couple.

b. Coitus Interruption (withdrawal of penis)

The principle of this method is the male withdraws his penis before ejaculation and prevents deposition of semen into vagina.

Disadvantages

- It gives sexual unsatisfaction to both partners.
- It is not reliable method because small amount of lubricating fluid which enters into vagina may contain sperms.
- It keeps strain on man's self-control.

c. Safe Period or Rhythm Method

This is also known as 'calender method'. One week before menstruation and one week after menstruation is considered as a safe period. During these days ovulation does not occur and conception can be avoided.

Advantages

- It is a natural means of birth control.
- It does not require an artificial means.

Disadvantages

- It is not reliable.
- It is difficult to find out safe period for a particular woman whose menstruation period changes.
- It requires arithmetic calculations.
- Many times there is no cooperation between the sexes.
- To be used by only educated and responsible couples.
- High failure rates.
- Ectopic pregnancies.
- Embryonic abnormalities.

13 Explain permanent/terminal methods of sterilization. (W. 23)

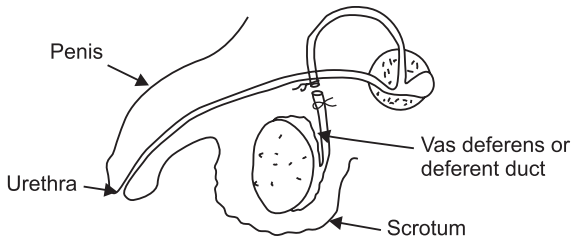
☞ Permanent or Terminal Methods of Sterilization (Terminal Sterilization)

Sterilization Methods of Family Planning

This method involves surgical operations for both sexes. The methods are suitable for male of 25–40 years or female of 20 to 45 years of age.

i. Male sterilization (vasectomy): The surgical operation in case of male is known as vasectomy.

In this small operation, a small cut is taken on vas deferens or deferent ducts. The ducts are cut and their open ends are tied or ligated. Sometimes the open ends are turned away from one another.



Vasectomy (male sterilization)

As the deferent ducts are cut and tied, the sperms from the testis are not carried towards urethra. Hence semen fluid ejaculated will not contain any sperm. Thus it prevents conception.

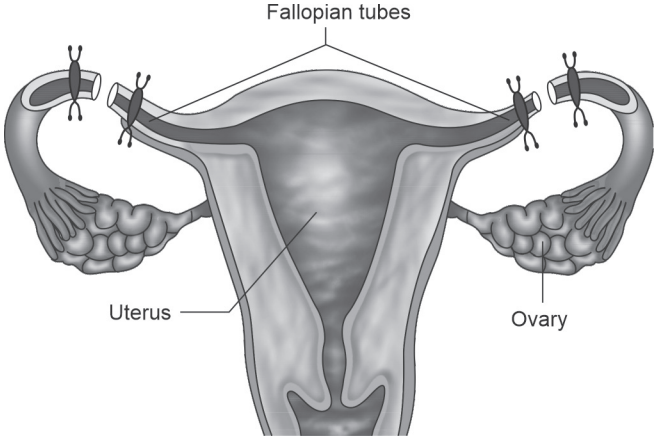
After the operation man should use other contraceptive methods during coitus such as condom at least for two months.

Disadvantages

- Possibility of infection.
- Granuloma of testis is possible.

ii. Female sterilization (tubectomy): The surgical operation in case of female is known as tubectomy.

In this operation, both the fallopian tubes are cut and tied. So that ovum cannot reach the uterus and thus no fertilization. The operation is major one and needs hospitalization. With the help of an instrument called laparoscope, the operation is performed within 2 to 3 minutes.



14 Explain the role of Pharmacist in promoting family planning.

☞ Role of Pharmacist in Promoting Family Planning

- Pharmacist can maintain a reliable supply of contraceptives with a choice of methods and brands.
- Pharmacist can learn about family planning and advise customers accurately and actively.
- Pharmacist can set up self-service displays of condoms, spermicidal and oral contraceptives.
- Pharmacist can distribute brochures about family planning and display family planning posters.
- Pharmacist can work with other medical professionals to promote family planning.
- Pharmacist can advise a woman to consult a doctor before giving oral contraceptives, especially in known diabetic or hypertensive persons.
- Pharmacist can support the development of contraceptive social marketing programmes.
- Pharmacist can promote the image of the pharmacist as a provider of family planning supplies and information.
- Pharmacist can work with pharmacist's organizations to encourage their members to promote family planning.
- Pharmacist can sponsor and attend training or refresher courses on family planning and encourage pharmacy staff to attend it.
- Pharmacist can promote changes in laws, wherever necessary, to allow pharmacists to dispense contraceptives without doctor's prescription.

B

Environment and Health

1 What is water pollution? Give the causes, sources and control measures of water pollution. (W. 23)

☞ Water Pollution

"Pollution of water caused by domestic sewage, toxic chemicals and industrial wastes is called water pollution."

Sources/Causes of Water Pollution

- Domestic wastes may contaminate the water.
- Sewage containing human excreta, urine and dung are discharged into water forms a major source of water pollution.
- Industrial wastes which contain toxic chemicals may pollute water.
- Agricultural wastes like fertilizers, pesticides cause water pollution.
- Thermal waste from thermal and nuclear power plants may discharge large amount of high temperature water into river which may affect aquatic life.
- Radioactive dust formed during atomic explosion contains radioisotopes which get into water and pollute the water.
- Many oil carrying ships moving in the large oceans may meet with an accidents leading to spilling of million of tons of oil in the sea cause water pollution.

Control of Water Pollution

- Educating the people to prevent the pollutants being released into drinking water supply.
- Whenever possible, the drinking water should be provided through the piped water supply.
- Sanitary wells should be provided where the piped water supply is not possible.

- Sewage must be treated both physically, chemically and biologically and then released in the rivers.
- Industrial effluent should be treated to neutralize toxic chemicals and released in the river.
- Water pollutants can be removed by adsorption, electrolysis filtration, etc.
- Prevention and control of Water Pollution Act was passed in India in 1974 which would ensure legal actions against water polluting bodies.
- Recycling of waste: Dung and urine of cattle can be conveniently used to generate biogas for cooking and heating, etc.

2 Discuss the hazards of water pollution. Or How water pollution affects community? Or What are the effects of water pollution on human health? (W. 23, S. 24)

- Polluted water may cause epidemic disease like cholera, dysentery, typhoid, jaundice, etc.
- Mercury is one of the most toxic metals produces abdominal and chest pains, diarrhea, mercury poisoning.
- Lead metal causes symptoms like constipation, loss of appetite.
- Arsenic presents in the polluted water may cause mental disturbance, liver cirrhosis, lung cancer, kidney damage, etc.
- The insecticides which get accumulated in the body of fish, enters in human body through food chain may cause cancer.
- Deficient O_2 in water due to industrial wastes, kills fishes and other aquatic animals.

3 What is air pollution? Give the composition of pure air. Mention the functions of pure air.

☞ Air Pollution

"An undesirable changes occurring in air causing harmful effects on man and domestic species is called air pollution."

Composition of Pure Air

i. Oxygen – 20.95%
ii. Carbon dioxide – 0.03 to 0.4%
iii. Nitrogen – 79%
iv. Water vapours Variable
v. Ammonia
vi. Organic matter
vii. Ozone
viii. Mineral salts } Traces

Functions of Pure Air

- Pure air is necessary for interchange of gases in the process of respiration.
- The regulation of body temperature.
- Purification of blood.

4 What are the causes and control measures of air pollution? (S. 22)

☞ Sources/Causes of Air Pollution

- *Respiration of men and animals*: The major impurities in expired air are CO_2 (4.41%), water vapours and organic matter. In the overcrowding rooms the air becomes stuffy with reduced O_2 content, hence may cause symptoms like headache, nausea. During coughing, sneezing and loud speaking by infected patient may lead to air pollution.
- *By combustion:* Burning of coals, oils may produce smoke which consist of poisonous gases. Domestic smoke sticks to the particles on which they fall and hence produce harmful effects.
- *Industrialization and vehicles*: Industries may produce smoke which pollutes the air. The air pollution may become more severe with more fires, furnaces, more motors and cars, etc.
- *Decomposition*: Animals and vegetables after decomposition give off poisonous gases like CO_2, H_2S, ammonia which may pollute air.
- *Dust*: The air of houses contains particles arising from wear and tear of articles may pollute the air, ashes, fibres of cotton, particles of hair spore, pollen grains may pollute the air.

Preventive/Control Measures of Air Pollution

- Health education of the public about harmful effects of air pollution.
- Modification of industrial processes to minimize air pollution by toxic materials.
- Traffic management to reduce pollution.
- Establishment of "green belt" between industrial and residential areas.
- Minimise the use of wood, coal oil, and to promote the use of electricity and natural gas.

- Legal measures to control emission of smoke and other pollutants.
- Disinfection of polluted air can be done by mechanical ventilation, UV radiation, dust control measures, etc.
- Use of high quality fuel in automobiles.
- Use of battery-operated vehicles.
- The industrial smoke must be filtered before releasing into the atmosphere.

5 What are problems/hazards/ill effects of air pollution? or What are the effects of air pollution on human health? (S. 22)

- Allergic diseases like bronchial asthma, bronchitis, and other lung disorders.
- Inhalation of polluted air causes heaviness, sleepiness, headache, vomiting.
- High levels of CO_2 can impair the normal vision of a person.
- CO_2 and nitrous oxide may reduce ability of blood to carry O_2.
- The heavy metal particulate pollutants cause cancer, hypertension, etc.
- SO_2 is a gaseous pollutant and causes drying of mouth.
- Particulate matter such as ash, dust, soot, smoke, etc. causes problems mainly with respiratory tract like irritation, coughing, allergic conditions, etc.
- Over a chronic period, exposure of air pollution leads to conjunctivitis, dermatitis, chronic bronchitis, rickets.

6 What are the "immediate effects" and "delayed effects" of air pollution on human health?

☞ The effects of air pollution on health may be categorised as:

Immediate Effects

It includes adverse effects on functions of respiratory system, e.g. bronchial asthma, irritation, coughing, bronchitis, lung disorders.

Delayed Effects

Over a chronic period exposure, air pollution leads to:

i. Conjunctivitis
ii. Dermatitis
iii. Chronic bronchitis
iv. Pneumoconiosis
v. Rickets
vi. Primary lung cancer.

7 What is noise? What are the sources of noise? What are auditory and nonauditory effects of noise? Give preventive measures to control noise pollution. (W. 22, S. 23)

☞ Noise

Noise is an "unwanted or unaccepted" sound.

- A sound becomes noise when it causes disturbances to the hearer.
- Noise is measured in units of decibel.
- People can tolerate the sound about 85 decibels.
- The sound begins to be uncomfortably loud at an intensity of 100 decibels and painful at 130 to 140 decibels.

Auditory Effects of Noise

- Permanent or temporary deafness.
- Auditory fatigue.
- Tinnitus.
- Damage of internal ear.
- Headache.

Nonauditory Effects of Noise

- Mental abnormality or confusion.
- Rise in blood pressure.
- Increased intracranial tension, heart rate, respiratory rate, etc.
- Increased sweating.
- Nausea, fatigue.
- Insomnia.
- Visual disturbances.

Sources of Noise

Automobiles, factories, industries, aircrafts, domestic noises from radio, television, transistor, atom bombs, etc.

Preventive and Control Measures of Noise

- To educate the public in general about bad effects of noise.
- Promoting interest of the industrial enterprises and transport authorities to control the noise.
- Vehicles must be periodically checked.
- Workers who are exposed to loud noise should be protected by wearing ear protectors or helmets.
- Legislation control.
- Periodic examination of workers is also necessary.
- Avoid the use of noisy machines.

8 What are the ill-effects of sunlight? State various methods to control them.

☞ **Ill-effects of Sunlight**

- Eye strain.
- Skin-darkening.
- Skin burn/sunstroke.
- Skin cancer.
- Headache.
- Tiredness and loss of efficiency.

Methods to Control Sunlight Effects

- Use sun goggles for the protection of eyes from UV rays.
- Wear hand gloves, hats, etc.
- Use sun-screen lotion and ointment before going into the sunlight, which protects the skin.
- Light coloured walls of the rooms are ideal for good lighting and controlling them.
- To control the excess sunlight ray in the rooms, goggle glasses may be used for windows.

9 Elaborate the adverse effects of poorlight on health.

- Headache.
- Eye strain.
- Tendency to postural deformity.
- Poking head.
- Lateral deviation of spine.
- Irritability of temper.
- Greater liability to accidents.
- Miner's nystagmus is caused by eye strains due to poor light.

10 What are different sources of water supply? Write a note on sources of water supply.

☞ The main sources of water supply are:

- Rain water and artificial lakes.
- Surface water, e.g. canals, rivers, tanks, ponds.
- Upland surface water, e.g. lakes.
- Groundwater, e.g. wells and springs.
- Sea water.

a. Rain Water

Rain is the primary source of all water. Rain water is pure initially but after coming into atmosphere it becomes impure.

Advantages

- Normal rain water is nonpathogenic.
- It is soft water as it contains no mineral salts.
- Rain water, if properly collected and stored, is a safe water.

Disadvantages

- It is soft and liable to corrode lead pipes and causes lead poisoning.
- The impurities such as dust microbes, gases may involved in it from atmosphere. Hence it may cause infection.
- Filtration and sterilization is essential.

b. Surface Water

Rain water on reaching the ground comes to a river, canal, stream, lake or pond and is called surface water.

Advantages

- It can be collected in large reservoir or setting tanks.
- After filtration, sterilization by chlorination it is suitable for drinking.

Disadvantages

- Surface water may contain suspended particles and disease causing agents and thus dangerous to drink.
- It should be filtrated and sterilized before use.

c. Upland Surface Water

Upland surface water runs on the side of hills, slopes and valleys and is taken off as water supply before it forms big streams and rivers.

Advantage

It is safe because it is pure rainwater which has travelled a short distance.

Disadvantage

It needs purification by filtration and sterilization by chlorination.

d. Groundwater

Groundwater is superior to surface water. Wells and springs are important sources of groundwater. An ideal well should be tapped in a good soil and should be at least 200 feet away from possible contamination source.

Advantages

- It is of good quality.
- No contamination of water on keeping long storage.
- It is free from pathogens.
- Usually requires no treatment.

Disadvantages

- High mineral content.
- Require lifting arrangement to water.
- The usual groundwater sources of wells and springs.

e. Sea water

Sea water is last and very large reservoir of water. The water from river, canals, stream is finally collected in the sea water. It may contain dust particles, pathogenic organisms, gases, salts, etc.

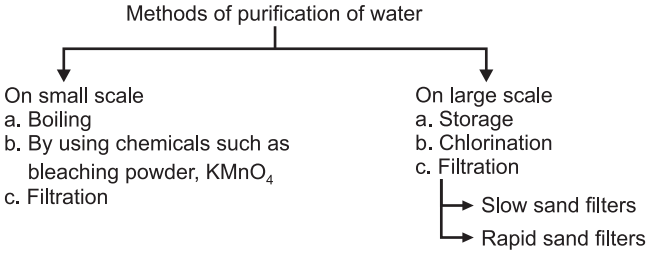
Advantage

It is a large reservoir.

Disadvantage

- Nonsuitable for drinking as such: Purification and treatment is necessary to use water for drinking purpose.

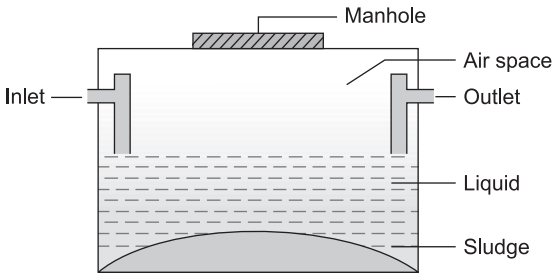
11 What are different methods of "purification of water"?



12 Describe the design and mechanism of septic tank.

- Septic tank is a sewage settling tank in which household waste water and excreta can be disposed off.
- As the sewage enters the tank, sedimentation occurs from the upper portion.
- A septic tank should have a minimum capacity of 2,00,000 litres.
- It is not suitable for very big communities.

- Septic tank is rectangular on the surface.
- Water is filled in the septic tanks, height of water column is 1 to 1.5 metres.
- There is an inlet and outlet pipe above the water level and air space above the water level.
- A cover of cement concrete is provided at the top with manhole in the center and the manhole is covered with another lid.



Mechanism

- The mechanism of septic tank is anaerobic digestion of the contents.
- The heavy solid settles down and decomposed by anaerobic bacteria which causes reduction in its volume and is rendered harmless.
- The solid at the bottom is called "sludge".
- The fatty and greasy substance rise to the water surface above and is passed out through the outlet pipe.
- Since this supernatant liquid effluent contains microorganisms, ova, it is allowed to be collected in trenches.
- It spreads in the soil, microorganisms die out and organic matter gets oxidised. This stage is called aerobic decomposition.
- The sludge from the bottom is removed every year as more sludge interferes with the working of the tank.
- This sludge is buried in trenches.

13 Discuss the methods used for purification of water on small scale.

☞ There are three methods used for purifying water on small scale: (a) Boiling, (b) chemical disinfection and (c) filtration.

a. Boiling

Boiling water for 10 minutes kills all living micro-organisms and their spores and water becomes sterile. Some of the salts present in water are also precipitated and hence there is a little change in taste also, i.e. it also removes temporary hardness of water. Water should be boiled preferably in the same container, in which it is to be stored to avoid contamination during storage.

b. Chemical Disinfection

By using following chemicals.

i. *Bleaching powder or chlorinated lime*: A fresh sample of bleaching powder contains 33% chlorine and if chlorine is 25%, it is acceptable for disinfection of water. To make bleaching powder more stable, lime is added to it and such sample is called stabilized bleach.

Bleaching powder is stored in dry, cool and dark places in air tight container. Amount of bleaching powder needed for one cubic metre water is 2.3 gm which leaves 0.5 mg chlorine/litre of water after one hour contact.

ii. *Chlorine tablets*: These are small tablets available for various quantities of water to be disinfected. They are comparatively stable and one tablet of 0.5 gm is sufficient for 20 litres of water.

iii. *Iodine*: 2% alcoholic solution of iodine can disinfect 1 litre of water within half an hour. It is used only in emergencies because it may give rise to thyroid disorders.

iv. *Potassium permanganate*: It is strong oxidizing agent and can kill cholera bacteria. It alters the taste, smell and colour of water.

c. Filtration

Small household filters are available. The filtering is done either through porcelain material or earth. Filters do not filter the viruses as they are very small in size. The filters are regularly washed with scrubbing to keep them in good condition. Only clear water is used in filters.

14 Describe the methods used for purification of water on large scale.

☞ On large scale water is purified in three stages: (a) Storage, (b) filtration and (c) chlorination.

a. Storage

It allows natural purification of water. The water is stored in large reservoirs. Almost all suspended particles settle down at the bottom and water becomes transparent and the action of natural sunlight is better on water. The organic matter present in water is oxidised by bacteria with the help of dissolved oxygen present in water. The water should not be stored for more than 2 weeks as algae and other aquatic vegetation grow on prolonged storage which may give bad colour and taste.

b. Filtration

This is the next stage of purification of water after storage and this removes almost 98–99% bacteria. Two types of filters used are:

i. Slow sand filters (biological filters).

ii. Rapid sand filters (mechanical filters).

c. Chlorination

It is most important and the last stage in water purification. It is supplement to the storage and filtration. On large scale, chlorination is done by bleaching powder. The sample should contain at least 25% chlorine. Chlorine kills the bacteria, oxidizes organic matter and to some extent it can remove bad taste and smell. The chemical reaction of water and chlorine is:

$$H_2O + Cl_2 \longrightarrow HCl + HOCl$$

$$HOCl \longrightarrow [H] + [OCl]$$

HCl is hydrochloric acid which is neutralized by the alkalinity of water. HOCl is hypochlorous acid which further breaks down into hydrogen and hypochlorite ion (OCl). The bactericidal action because of hypochlorous acid (HOCl) and hypochlorite ion (OCl). Hypochlorous acid acts best in neutral pH, i.e. 7.

Chlorination is effective only if water is clear. The need of chlorine is estimated, i.e. how much chlorine will disinfect water, which is called "chlorine demand" of water. When processes of disinfection is complete, free chlorine starts appearing in water. The point, where free chlorine appears in water is called "breaking point". The time for which chlorine is allowed to act in water is called "contact period", which is at least 1 hour. To avoid contamination in future during water transportation and storage, some free chlorine is left in water.

15 What is sewage? What are the aims of sewage purification? Elaborate biological treatment of sewage. How disposal of sewage is done? Write a note on sewage. (S. 23)

☞ Sewage

Sewage is polluted material contains waste water, excreta, industrial waste and waste water from public places. Sewage looks like very dirty water with a bad smell. Sewage is a water contains 0.1% solids. The solids include organic and inorganic substances, microorganisms, dust, fibres. The organic matter partly decomposes naturally during the passage by the action of bacteria, present in it and thus it is foul smelling.

Sewage Treatment

In modern sewage plants certain biological and chemical changes take place. The processes are aerobic and anaerobic decomposition of the organic matter by bacteria present in it. The big solid particles are removed by screening and sedimentation. Sewage treatment involves two stages:

i. **Primary treatment:** It includes the removal of big solid objects and sedimentation associated with anaerobic respiration. It is carried out in two different steps:
   a. *Screening*: The sewage from public sewers is passed through a special screen to remove floating wood, dead animals or any other big objects.
   b. *Grit settling chamber*: The screened sewage is allowed to pass through a long chamber of 10–12 metres in length slowly so that heavy particles like sand, small stones, grit, etc. settle down at the bottom. The settled material is removed from the chamber and disposed of by burying. Primary sedimentation tank is used for this purpose to separate "effluents" and "sludge". Effluents undergoes secondary treatment.

ii. **Secondary treatment:** Effluents are treated with the antimicrobial agents to kill all the microbes and then they are passed to the rivers.

16 What are solid wastes/refuse? What are the sources of solid wastes? What are the hazards of accumulated solid waste? Describe the methods of disposal of solid wastes/refuse. (S. 23, 24, W. 23)

☞ Solid Wastes/Refuse

"Solid waste or refuse is the unwanted waste material from the industries, houses, streets and agricultural activities."

Refuse is harmful to human health because when it decomposes and ferments, it attracts flies, rodents, pigs and other animals. Therefore, refuse should be collected in a sanitary manner, transported and disposed of as quickly as possible.

Sources of Refuse

- Street refuse collected by cleaning street.
- Market refuse, e.g. rotten fruits and vegetables, leaves, animals droppings.
- Industrial refuse.
- The domestic refuse, e.g. ashes, paper, metal, wood, glass, dust, garbage.

Hazards of Solid Waste Accumulation

- Fermentation of organic matter gives bad odour and may help in fly breeding.
- Refuse attracts rats, flies which convey pathogens to man.
- There is a risk of air pollution.
- There is a possibility of water pollution if rainwater passes through deposits of fermenting refuse.

Disposal of Solid Wastes/Refuse

The principle methods of refuse disposal are:

- Dumping.
- Manure pits.
- Burning.
- Sanitary land filling.
- Compositing.
- Burial.

a. Dumping

The refuse is dumped in low areas and pits and the surface is made level and is suitable only for dry refuse. It is not preferred nowadays because it causes public nuisance, attracts insects and animals and causes air and water pollution.

b. Manure Pits

They can be used at household level. Every house should have a manure pits and refuse of all types from the house should be put into it and covered by earth in the evening. When pits is full it is covered with earth and left for 6 months. It gives manures for field.

c. Burning

- It is also called incineration.
- It is suitable for hospital refuse.
- It requires sufficient space and a special equipment called "incinerator".
- It is a hollow cylinder made up of metal.
- The refuse is put on the land and covered with incinerator before burning to avoid spread during burning.
- In India it is not suitable because it is a direct loss of manure and the process is expensive.

d. Sanitary Land Filling

- A trench is dug.
- The refuse is put in the trench and covered with earth everyday.
- When the trench is nearby full, it is covered with earth and is impacted.
- Sometimes alternate layers of refuse and mud are replaced in the trench till it is full.
- Once trench is full, it is covered.
- Due to chemical and bacteriological process, decompose the refuse into simple substances with generation of heat.
- The temperature rises over 60°C within a week and cools down in 15 to 20 days.
- The refuse is fully decomposed at the end of 6 months and can be used as manure.

e. Composting

- In this method refuse and excreta is disposed of together.
- The basic principle is that when the refuse and excreta are dumped in a pit and covered with earth there is anaerobic decomposition and disease producing organisms also die because of heat and ultimately we get "compost" which is used as manure.

f. Burial

In this method small trench is dug and refuse is put in and covered with earth everyday, when full it is covered with earth and another trench is dug.

17 Explain the method of excreta disposal. Discuss the important features of RCA latrine.

☞ RCA Latrine

It is a most accepted type which is designed by Research Cum Action (RCA) Project, Government of India.

Important Features of RCA Latrine

Location

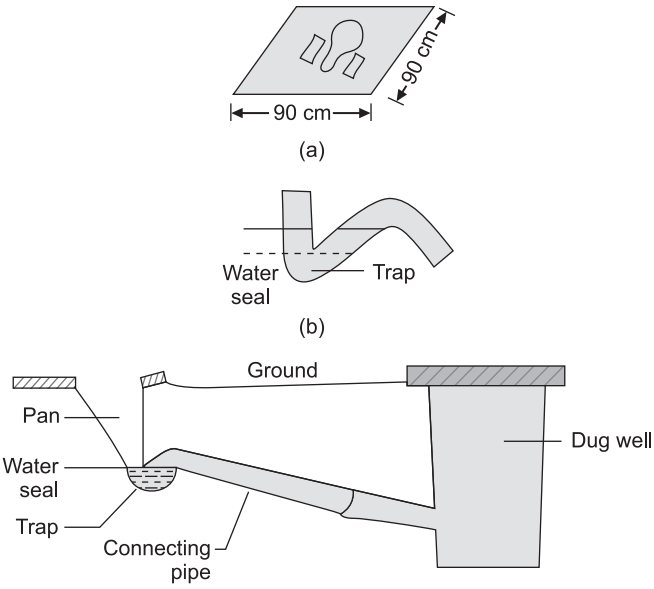
A dug well is needed for RCA latrine, to avoid all possibilities of groundwater contamination a distance of minimum 15 metres should be kept from any source of water.

Features of RCA latrine

- *Squatting plate*: It is called squatting plate because Indians use squatting posture for defecation. It should have a square stage of minimum 90 cm × 90 cm lined with cement and should have slight slope towards the centre to facilitate cleaning. Raised foot rest may be provided for comfort.
- *Pan*: It is the receptacle of faecal matter, urine and wash water. It is broad at back and narrow at the front end. The length from front to back is 42.5 cm, the width of widest portion is 20 cm and narrowest portion is 12.5 cm. The pan is having smooth, uniform and previous finish and a hole is provided at the back end.
- *Trap*: It is a bent pipe of 7.5 cm diameter. Its vertical portion is attached with pan. It holds some water and water level is called water seal. It is usually 2 cm.
- *Connecting pipe*: The bend end of the trap is attached with the connecting pipe of the same diameter 7.5 cm for carrying the faeces to dug well.

The dug well has 75 cm diameter and 3–4 metres in depth.

Sometimes a latrine without a connecting pipe is constructed and dug well is just below the installation. This is called direct RCA latrine. Latrine with the connecting pipe is called indirect RCA latrine.



18 What are different types of wells?

☞ **Wells have been classified into: Shallow wells, sanitary wells, tube wells, dug wells.**

a. Shallow Wells

Shallow well is one which provides water from the first impervious layer of ground and deep well taps water from below the first impervious layer.

b. Sanitary Wells

Features

- All the kaccha wells should be made pacca by providing an impervious lining at least up to 20 feet depth.
- The location of well should not be very near to living places and not very far off. The distance should be 15 to 100 metres.
- The well should be elevated from the ground to minimise contamination during rains.
- The lining of the well should be raised 2–3 feet above the ground and a cement concrete platform must be provided around the well within 1 metre radius.

- Every well should have a hand pump to lift the water.
- Safety and potability of sanitary well water depend on behaviour of user community.

c. Tube Wells

They are also shallow or deep wells fitted with pumping arrangement, the hand pump. Deep tube wells give water throughout the year and do not depend upon rainfall.

19 What is ventilation? State the types of ventilation. Give uses of ventilation.

☞ Ventilation

Ventilation is the change of the air of a room and supply of fresh air at a proper temperature and humidity. Ventilation continuously takes place naturally by wind.

Types of Ventilation

- Ventilation provided in the form of a window.
- Cross ventilation: It means when the windows and doors are facing each other and if wind blows from one it can easily pass through the other.
- Ventilation by efficient exhaust system.
- Mechanical ventilation by fan, electric devices.

Uses of Ventilation

- Ventilation keeps pure air in the houses.
- Ventilation by natural wind always exchanges the air in the houses.
- Ventilation is the requirement of first aid proper treatment for some of the patients.

20 Write a note on "occupational illness"/diseases/enlist various occupational illness occurred in India. Give its causes.

☞ Occupational Illness

Definition

- An occupational illness is a disease caused as a result of an exposure to risk factors arising from work.

- An occupational illness is defined as any abnormal condition or disorder resulting from a non-instantaneous event or exposure in the work environment.
- Occupational illness may be caused by poor air quality, exposure to chemicals, lack of sanitation and number of other hazards.
- Globally, an estimated 2.34 million people die each year from work related accidents and diseases.

☞ The major occupational diseases of concern in India are:

1. Silicosis.
2. Musculoskeletal injuries.
3. Coal worker's pneumoconiosis.
4. Chronic obstructive lung diseases.
5. Asbestosis.
6. Byssinosis.
7. Pesticide poisoning.
8. Noise-induced hearing loss.

International Labour Organization (ILO) prepares and updates the list of occupational diseases and publish it.

The latest occupational diseases are classified and published in 2010 are as follows.

1. Occupational diseases caused by exposure to agents arising from work activities:
   (i) Diseases caused by chemical agents (42 types)
   (ii) Diseases caused by physical agents (7 types)
   (iii) Biological agents and infections or parasitic diseases (9 types)
2. Occupational diseases by target organ systems:
   (i) Respiratory diseases (12 types)
   (ii) Skin diseases (4 types)
   (iii) Musculoskeletal disorders (8 types)
3. Mental and behavioural disorders (2 types)
4. Occupational cancer: Cancer caused by the various agents (21 types)

21 Write a note on "environmental pollution due to pharmaceuticals. (S. 23)

☞ **Environmental Pollution due to Pharmaceuticals**

- Environmental pollution may be due to pharmaceutical drugs and metabolites, which reach the aquatic environment through waste water.
- The drug pollution is therefore mainly a form of water pollution.
- Many pharmaceuticals are incompletely eliminated at sewage treatment plants.
- Many drugs appeared in surface water, groundwater and marine systems in various concentrations causing water pollution.
- Direct release of veterinary pharmaceuticals in the environment may occur in fish farming.
- From agricultural activities many insecticides, pesticides, chemical fertilizers may enter in the waste water and cause water pollution.
- Pharmaceuticals are also detected in untreated and biologically treated municipal waste water, surface water and a very few in drinking water also.

☞ **Causes of Pharmaceutical Pollution:**

1. Consumed drugs discharged in domestic waters.
2. Healthcare institution, i.e. hospitals and nursing homes also contribute to pharmaceutical pollution.
3. From pharmaceutical manufacturers the industrial wastes are disposed either by landfilling or drained as waste water.
4. Agriculture and agroproducts may cause environmental pollution.
5. Human domestic drug use and disposal behaviour.

☞ **Effects of Pharmaceutical Pollution:**

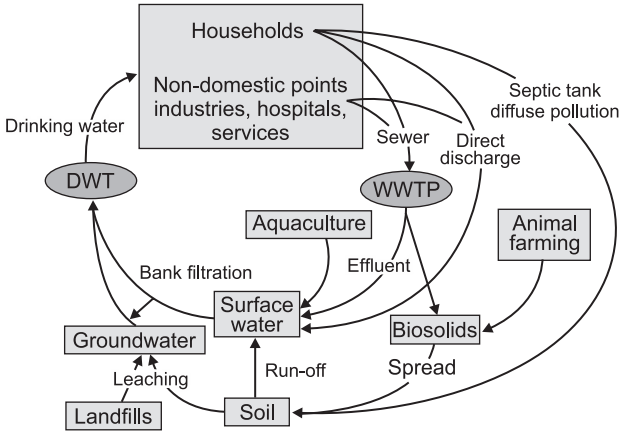
1. Effect on fish and aquatic life.
2. Disrupting the normal operations of the sewage processes.
3. Effect on drinking water.
4. Long-term effects on the environment.
5. Antibiotic resistance.
6. Effects on wildlife.

☞ **Control Measures on Pharmaceutical Pollution:**

1. Proper drug disposal.
2. Strict legal actions against failures.

3. Additional research to control potential dangers of pharmaceutical pollution.
4. To control on bulk purchases of pharmaceuticals.
5. Proper disposal of pharmaceuticals.

☞ Origin and Routes or Pharmaceutical Products:



Origin and routes of pharmaceutical products

C

Mother and Child Healthcare

1 Write a note on "Mother and Child Healthcare".

☞ **Mother and Child Healthcare:**

- Mother and children are the foremost priorities of community health programme.
- Health status of mother and child are the prime indicators of assessing health situation of a country.
- Improving the mother and child health is the aim to be achieved as national health goals as well as the millennium development goals (MDGs).
- Birth weight is an important risk factor for child survival, as children with low birth weight are more likely to have impaired growth, higher mortality and risk of chronic adult diseases.
- The nutritional status of adolescent girls and young women is necessarily linked to the birth weight of their children and subsequently to child survival.
- The use of contraceptive has the potential to improve child survival by increasing the interval between successive pregnancies.
- There are two dimensions of healthcare:
  (a) Stages of the life cycle.
  (b) Places where the care is provided.

These two constitute the 'continuum of care'. This continuum of care approach has been adopted under the national health programmes.

This strategic approach to reproductive, maternal newborn, child plus adolescent health (RMNCH + A) is desirable.

- The 'plus' in the strategic approach denote the:
  (a) Inclusion of adolescence as a distinct 'life stage' in the overall strategy.

(b) Linking of maternal and child health to reproductive health and other components.

(c) Linking of community and facility-based care.

- Total fertility rate (TFR) is one of the key indicators of good reproductive health of the community.
- TFR is linked to maternal health and child survival.
- TFR is defined as the average number of children that would be born to a woman over her reproductive life span.
- As TFR decreases, maternal mortality rate also declines.
- The low TFR impacts child survival by bringing optimum spacing between successive pregnancies.

2 What is breastfeeding? Give the importance of breastfeeding. (S. 22, W. 23)

☞ **Breastfeeding:**

- Breastfeeding is the best way to satisfy the nutritional and psychological needs of the baby.
- Breastfeeding is also called nursing. It is the process of feeding human breast milk to a child, either directly from the breast or by expressing (pumping out) the milk from the breast and bottle feeding it to the infant.
- Mother's milk contains all nutrients in correct proportion necessary for the growth and development of the baby.
- The human milk has inherent anti-infective properties.
- Initial breastfeeding is extremely important for establishing successful lactation as well as for providing 'colostrum' (mother's first milk) to the baby.
- Ideally, the baby should receive the first breastfeed as soon as possible and preferably within half an hour of birth. It is essential that the baby gets the first breast milk called 'colostrum' which is thicker and yellowish than later milk and comes only in small amount in the first few days.
- Colostrum is good for the baby, it will take care of the first hunger. Colostrum is all the food and fluid needed at this time—no supplements are necessary, not even water.

- Breast milk provides good quality proteins, fats, vitamins, calcium, iron and other minerals even beyond 4 months.
- Breastfeeding is associated with better cognitive development possibly due to high content of docosahexaenoic acid (DHA) which plays an important role in brain development.
- **Advantages of breast milk:**
  1. Breast milk contains all essential nutrients needed for the infants, it provides the best nutrition and protects the infants from infection.
  2. Breast milk is a natural food and is more easily digested and absorbed by the infant as compared to formula milk prepared from other sources.
- **Cares to be taken during breastfeeding:**
  1. Start the breastfeeding within half an hour after delivery and do not discard colostrum.
  2. Continue breastfeeding up to 2 years and beyond in addition to nutrient rich complementary foods (weaning foods).
  3. Breastfeed the infant frequently and on demand to establish and maintain good milk supply.
  4. Take a nutritive diet both during pregnancy and nutrition.
  5. Avoid tobacco, alcohol and drugs during lactation.
  6. Food supplements should be introduced for infants after 6 months.
- **Following are the guidelines for weaning:**

Guidelines for weaning

Sr. No.	Age	Supplementary foods (breastfeeding continued)	Frequency of supplement
1.	First food after 6 months	Ripe banana, sweet potato	1 feed/day
2.	Next food, 1 week after first food; 7 to 8 months	Continue above food and include wheat flour or ground rice.	1 more feed, total 2 feeds

Contd.

Contd.

Sr. No.	Age	Supplementary foods (breastfeeding continued)	Frequency of supplement
		Above food + Mashed dal + Raggi or ground millet mixed with oil	Start with 1 feed/day, and increase to 3 feeds/day
3.	9 to 12 months	Chapati softened in milk, green leafy vegetables added to dal or khichri, idli, upma, curd, rice, vegetables, fruits, etc. Egg, meat, fish if and as needed/accepted.	4 to 6 feeds/day

3 What are ill effects of infant milk substitute and bottle feeding? (S. 22, 24)

☞ **Ill effects of infant milk substitute and bottle feeding:**

- Breastfeeding rates are reduced as women entered the work force and companies began widespread advertisements for infant milk substitutes.
- Due to impressive marketing by private companies, there is a huge use of infant milk substitute that leads to increasing infant mortality.
- **Following are the ill effects of infant milk substitute and bottle feeding:**
  - (i) The chances of infection are increased.
  - (ii) Diarrhoeal diseases can be common in children with early weaning.
  - (iii) Anemia is common in children with early weaning.
  - (iv) Early weaning may cause problems related to indigestion of carbohydrates.
  - (v) It affects the mother baby bonding.

In 1981, WHO international code of marketing breast milk substitutes was passed.

"The Infant Milk Substitute, Feeding Bottles and Infant Foods Act" was passed in 1992.

Summary of WHO code is as follows:

- No advertising to the public.
- No free sample or gifts to mothers.
- No promotion of products in healthcare facilities.
- No contact of mothers by company representatives.
- No gift or samples to health workers.
- No baby pictures idealizing formula.
- No unsuitable products such as sweetened condensed milk to be promoted for babies.
- Inform the professional groups and NGOs not to violate the code.

4 State advantages and disadvantages of bottle feeding in infants. (S. 24)

☞ **Bottle feeding in infants**

Advantages:

1. Anyone can feed the baby.
2. It can be done in public
3. Keeping a track of your baby's intake is easy
4. Beneficial when breast milk supply is low.
5. It helps the babies who have lactose intolerance

Disadvantages:

1. Formula milk is not as nutritious as breast milk
2. Preparing the milk for
3. Bottle feeding equipment is an added expense.
4. It affects the mothe-baby bonding.
5. The chances of infection and diarrhoea.

D

Overview of Vaccines and Immunity

1 Define vaccine. Give the types of vaccines with examples.

☞ **Vaccine:**

Vaccine means all biological preparations produced from living organisms that enhance immunity against disease and either prevent (prophylactic vaccines) or in some cases to treat disease (therapeutic vaccines)

- Vaccines are the preparations containing antigens which stimulate the body to produce antibodies.
- Vaccines are administered in liquid form, either by injection, oral or by intranasal routes.

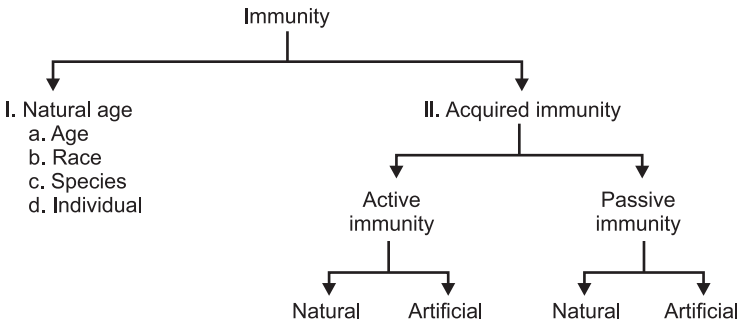
☞ **Types of Vaccines with Examples:**

1. Live-attenuated vaccine, e.g. measles, mumps, rubella, varicella zoster.
2. Inactivated vaccine, e.g. hepatitis A, influenza.
3. Recombinant subunit, e.g. hepatitis B
4. Toxoid, e.g. tetanus, diphtheria
5. Conjugate polysaccharide protein, e.g. pneumococcal, meningococcal.

2 Define immunity. Classify immunity.

☞ **Immunity**

Immunity is the power of the body to resist effect of invasion of pathogenic microorganism in the body.



3 Give the difference between active immunity and passive immunity.

☞ **Difference between active and passive immunity**

Active immunity	Passive immunity
1. Antigens are injected in the human body, as a result antibodies are formed	Readymade antibodies are injected in the human body
2. It develops slowly.	It develops quickly
3. It remains for a longer time	It remains for short period
4. The treatment is preventive	The treatment is therapeutic
5. Immunological memory is present	Immunological memory is absent
6. Not useful in immunodeficient hosts	Useful to immunodeficient hosts
	May be acquired from mother
7. No inheritance	Preparations, e.g. sera, antiserum.
8. Preparations, e.g. vaccines, toxoids	

4 Define immunization. What are immunological products? Classify immunological products giving examples.

☞ **Immunization:**

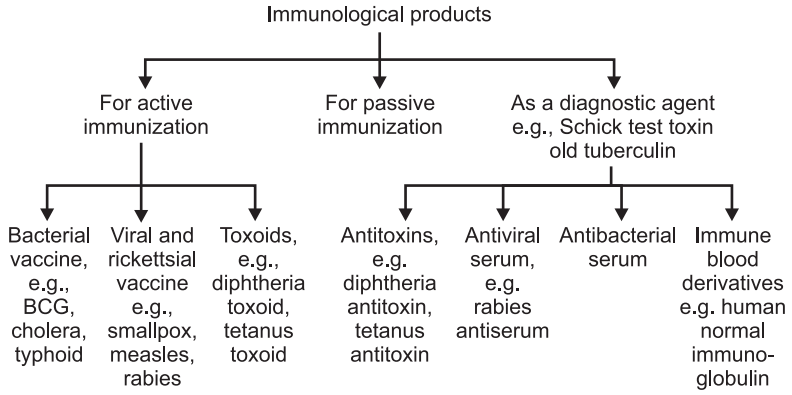
Immunization is the process whereby a person is made immune or resistant to an infections disease, typically by the administration of a vaccine.

Vaccines stimulate the body's own immune system to protect the person against subsequent infection.

Immunological products:

These are the preparations having immunogenic properties which are used for the prevention of disease or treatment of disease and for diagnostic purposes.

Classification of immunological products



E

Psychosocial Pharmacy

1 Define psychosocial pharmacy. What is drug abuse? Give the reasons of drug abuse/addiction. Classify the drugs of abuse. (W. 22)

☞ **Psychosocial Pharmacy:**

It is the branch that deals with effects of medicinal agents on a state of mental, emotional, social and spiritual well-being of the individual.

- **Drug abuse:** The persistent and excessive use of drugs apart from medical need is called drug abuse.
- **Reasons for drug abuse/risk factors for drug abuse:**
  - (i) The consumption of drug upon medicinal use.
  - (ii) Family history of substance abuse.
  - (iii) History of depression and low self-esteem.
  - (iv) To satisfy curiosity about drug effect.
  - (v) To have a new thrilling or dangerous experience.
  - (vi) To relax from stress and strain.
  - (vii) To escape from reality and to have a dreamy state.
- **The drugs of abuse/addiction are classified as:**
  1. Cannabinoids, e.g. hashish, marijuana
  2. CNS stimulants, e.g. tobacco, amphetamine, cocaine
  3. CNS depressants, e.g. barbiturates, benzodiazepines.
  4. Narcotics, e.g. opioid and morphine derivatives (morphine, heroin, vicodin)
  5. Hallucinogens, e.g. LSD, mescaline
  6. Other compounds, e.g. steroids, inhalants.

2 What is drug addiction? What are the signs and symptoms/causes/reasons of drug addictions. (W. 22)

☞ **Drug Addiction:**

"A continuous administration of certain drugs forces the person to use more doses and tendency to increase the dose and high tendency to withdrawal effects is known as drug addiction."

☞ **Signs and Symptoms/Causes/Reasons of Drug Addiction:**

1. Upon consumption of drug for medicinal use.
2. Feeling that one needs the drug on a regular basis to have a fun, relax or deal with problems.
3. To satisfy curiosity about drug effect.
4. To have a thrilling or dangerous experience.
5. Sudden changes in work or school attendance and quality of work or grades.
6. Frequently borrowing money or stealing items from employer, home or school.
7. To escape from reality and have a dream state.
8. Anger outbursts, acting irresponsibly and overall attitude change.
9. Deterioration of physical appearance and grooming.
10. Talking about the drugs at all the times.
11. Feeling exhausted, depressed, hopeless or suicidal.

3 What are warning signs, a teenager has a problem of drug abuse?

☞ **Teenager having a problem of drug abuse may show following signs:**

1. **Physical signs:** Fatigue, repeated health complaints, red and glazed eyes, lasting cough.
2. **Emotional signs:** Personality change, sudden mood changes, irritability, irresponsive behaviour, poor judgement, general lack of interest.
3. **Family dynamics:** Starting arguments, negative attitudes, withdrawing from family secretiveness.
4. **School behaviours:** Decreased interest, negative attitude, frequent absentee, discipline problems.
5. **Social problems:** New friends, problems with the law, changes in physical appearance, request for money out of ordinary needs.

4 What are psychotropics/psychotropic drugs? Give examples, name the conditions/diseases where psychotropics are used.

☞ **Psychotropics:**

"Psychotropics are the substances which change the brain function and result in alterations in mood, perception or consciousness".

☞ **Psychotropic drugs are:**

1. Anxiolytics, e.g. benzodiazepines
2. Euphoriant, e.g. MDMA
3. Stimulants, e.g. amphetamine
4. Depressants, e.g. alcohol
5. Hallucinogens, e.g. LSD.

☞ **Uses of psychotropics:**

In the treatment of:

- Anxiety
- Depression
- Schizophrenia
- Bipolar disorder
- Sleep disorder

5 Write a note on "alcohol addiction".

☞ **Alcohol Addiction:**

- Alcohol addiction is a behavioural disorder and a chronic disease state resulting due to persistent and excessive use of alcohol.
- It causes physical disability and impaired emotional, occupational and interpersonal adjustment.
- Alcohol addiction involves both tolerance and physical dependence.

☞ **Effects of Alcohol on Health:**

Alcohol consumption has:

1. Number of health and social problems.
2. It is an important cause of death and disability.
3. It affects most of the organs of the body.
4. Worldwide alcohol causes 1.8 million deaths each year due to alcohol consumption.

☞ **Medical Complications of Alcohol Addiction:**

- Malabsorption
- Gastritis
- Cirrhosis of liver
- Fatty liver
- Chronic diarrhea
- Beriberi
- Cutaneous ulcers

- Delirium
- Tremors
- Convulsions
- Pellagra
- Hypo-/hyperglycemia.

☞ **Withdrawal Symptoms of Alcohol Addiction:**

- Nausea/vomiting
- Insomnia
- Weakness
- Headache
- Sweating
- Increased pulse
- Fits
- Elevated BP
- Anxiety
- Depressed mood
- Agitation
- Disorientation
- Illusions and delusions.

☞ **The problems due to Alcohol Addiction:**

(a) **Social problems:**

- Marital disharmony and domestic violence.
- Neglect of children.
- Criminal behaviour.
- Unsafe sex.
- Financial problems.

(b) **Family problems:**

Alcohol addiction may destroy the home, relationships and economic status.

(c) **Occupational problems:**

- Poor work performance.
- Absenteeism.
- Poor relationship with colleague
- Discipline problems.
- Loss of job.
- Industrial losses.
- Losses to society.

☞ **Control/ Treatment of Alcohol Addiction/Dependence:**

1. Detoxification.
2. Substitution therapy.
3. Gradual withdrawal of drug.
4. Psychotherapy and occupational therapy.
5. Drug therapy.
6. Correction of dietary factors.
7. Community treatment.
8. Rehabilitation.
9. Family counseling.
10. Correction of nutritional deficiencies mainly vitamins B_1 and B_3.

6 Write a note on "Tobacco and Tobacco-related products.

☞ **Tobacco and Tobacco-related Products:**

Tobacco is used in two major forms: Smoking form and smokeless form. In India, following smoke-related products are available.

Beedis

These are made by rolling a dried, rectangular piece of tendu leaf with 0.15–0.25 g of sun-dried, flaked tobacco. 34% of the tobacco produced in India is used for making beedis. Majority of rural population use this form of smoking.

Cigars

These are made up of air-cured, fermented tobacco, usually in factories, and are generally expensive as compared to beedis. Cigar smoking is predominantly an urban practice.

Cheroots

These are the rolls made from tobacco leaves.

Chuttas

These are coarsely prepared cheroots. Usually these are the products of small-scale, cottage industries or even home-made. Nearly 9% of the tobacco is used for these products.

Dhumti

These are prepared by smokers themselves. Dhumti is a kind of conical cigar made by rolling tobacco leaf in the leaf of another plant.

Pipe

Different types of pipes are used to fill the tobacco. The pipes range from small-stemmed European type to long-stemmed pipes made from metal or other materials.

Hooklis

These are clay pipes commonly used in Western India. Once the pipe is lit, it is smoked intermittently. On an average, 15 g of tobacco is smoked daily.

Chillum

A chillum is a straight, conical pipe made of clay, 10–14 cm long held vertically. One chillum is shared by a group. It is an exclusive male practice used in northern India. It involves deep pulmonary effect. It predates to introduction of smoking in India.

Hookah

The hookah is an Indian water pipe in which the tobacco smoke passes through water before inhalation.

In addition to these, following smokeless forms of tobacco products are available in India.

Paan with Tobacco

Paan consists of four main ingredients—betel leaf, areca nut, slaked lime and catechu. Habitual paan chewers include tobacco in it. Tobacco is referred to as *kaddipudi* and *hogesoppu* in Karnataka, *kadapan* in Odisha and West Bengal, and *pattiwala* in Uttar Pradesh. *Zarda* and *kiwam* are commercially manufactured varieties often used as ingredients in paan.

Paan Masala

It is a commercial preparation containing areca nut, slaked lime, catechu and condiments with or without powdered tobacco. All the components are dehydrated so that the final product is not perishable. It is a popular Indian product with a market of hundreds of crores of rupees.

Tobacco, Areca Nut and Lime Products

Combinations of tobacco, areca nut and slaked lime are chewed in several regions of North India by different names.

Manipuri Tobacco

It contains tobacco with slaked lime, finely cut areca nut, camphor and cloves. It is available in Manipuri district of Uttar Pradesh and nearby areas.

Mawa

It contains thin shavings of areca nut along with tobacco and slaked lime. It is popular in Gujarat, especially among the youth.

Khaini

Use of a mixture of sun-dried tobacco and slaked lime is known as khaini. It is widespread in Maharashtra and several states of North India. A regular khaini user may carry a double-ended metal container, one side of which is filled with tobacco and the other side with slightly moistened slaked lime.

Chewing Tobacco

Small pieces of raw or commercially available finely cut tobacco are used for this purpose; chewing of tobacco alone does not appear to be very common in India.

Snuff

Swedish snuff called snus is available in tea bag like pouches. The pouch can be kept in the buccal or labial groove and sucked. It is marketed in India under the brand name Click.

Following tobacco products for application are used in India

Mishri

It is a roasted, powdered preparation made by baking tobacco on a hot metal plate until it is uniformly black. Women use it to clean their teeth initially, soon apply mishry several times a day. The practice is common in Maharashtra and Goa. Even males use it occasionally.

Gul

It is a pyrolysed tobacco product, marketed under different brand names in small tin cans and used as a dentifrice in the eastern part of India including Assam, Meghalaya, Nagaland and Sikkim.

Bajjar

It is a dry snuff, also known as *tapkeer* applied commonly by women in Gujarat on the teeth and gums.

Lal dantmanjan

It is a dentifrice; a red coloured tooth powder. Traditionally it contains tobacco; however, a law has been passed now banning use of tobacco in dental care products.

Gudhaku

It is a paste made up of tobacco and molasses. It is available commercially and is carried in a metal container. It is applied to the teeth and gums, predominantly by women. It is commonly used in Bihar, Odisha, Uttar Pradesh and Uttarakhand.

Creamy snuff

Commercial preparations of tobacco paste are marketed in toothpaste like tubes. They are advertised as possessing antibacterial activity and being good for the gums and teeth. The product is popular with children in Goa.

Tobacco water

It is manufactured by passing tobacco smoke through water. It is known as *tuibur* in Mizoram and *hidakphu* in Manipur.

Nicotine chewing gum

The gum containing 2% nicotine is available under the brand name *goodkha*. It is launched as a help for tobacco cessation. For chewers, it is available in *gutka* flavour and for smokers, in mint flavour.

7 What is the impact/effect of drug abuse on social health?/Write a note on impact of drug abuse on social health. (S. 24)

☞ • Drug abuse has a severe social impact on the community life.

- The following are some complications or effects of drug abuse:
  - Loss of coordination.
  - Poor judgement.
  - Memory loss.
  - Risk of personal safety.
  - Damage to health.
  - Destructive behaviour.
  - Drug dependency.
  - May loose the trust of their friends and family.

☞ Impact of Drug Abuse on Social Health

1. **Lack of productive employment and impact on the workplace**
   - The workplace is a part of community, reflecting its strengths and weaknesses.
   - Drug abuse may produce problems for employers as they are under competitive pressure to increase output.
   - The use of alcohol, tobacco, etc. by the employee at workplace creates significant problems.
   - This may reduce efficiency of the organisation and also may disturb the smooth functioning.
2. **Implications of rural and urban poverty**
   - Drug abuse may affect the rural and urban localities, thus may create weak economic status of the families and leads to poverty.
   - Rural poverty is more related to the supply of illicit drugs and urban poverty is more related to both dealing and demand.
3. **Marginalization**

   Due to its highly varied nature in different sociocultural contexts, drug abuse may be seen as normative, marginal deviant or criminal behaviour.

   Process of marginalization apply to behaviour of governments and communities as well as people. Large number of people are migrating from rural to urban area where serious housing, health and education problems may occur. Drug problems may marginalize governments and institutions as well as people.
4. **Suicidal behaviours:**
   - Drug abuse and suicide have a very complicated relationship, where addiction greatly increases the risk of suicide and suicidal thoughts and tendencies greatly increase the risk of addiction.
   - Suicide is the most severe form and behavioural expression of psychological distress and it is a serious public health issue.
   - The drug abuse and addiction actually increase the severity and duration of depressive episodes, which actually increasing likelihood of suicidal thoughts.
   - Mental counselling of the students in the colleges/universities is necessary to avoid suicidal behaviours.

8 What is meant by drug abuse and misuse? Give its prevention and control measures. (W. 22)

☞ **Drug abuse:** The persistent and excessive use of drugs apart from medical need is called drug abuse.

Drug misuse: It means the use of a substance for a purpose not consistent with legal or medical guidelines.

Prevention and control measures:

1. Effectively deal with peer pressure.
2. Deal with life pressure
3. Seek help for mental illness
4. Examine every risk factor
5. Keep a well balanced life
6. Education
7. Family based prevention
8. School-based drug abuse prevention program
9. Community-based drug abuse prevention program.

OBJECTIVE QUESTIONS WITH ANSWERS IN BOLD LETTERS

1. **Demographic cycle** suggests the population growth of the nation.
2. The milk made by the female body in the last days after birth of the baby is named as **Colostrum**.
3. Breastfeeding is not recommended for mothers who have **HIV**.
4. The process of introduction of weakened pathogen into human body is called **vaccination**.
5. The woman's reproductive period is from **15 to 45 years**.
6. **Decibel** is the unit of measurement of noise.
7. **Contraception** is one of the fertility reduction practices.
8. There are **5 cycles** of demographic cycle.
9. **Refuse** is an unwanted waste material from the industries, houses, streets and agricultural activities.
10. This area draining into the reservoir is called **catchment area**.
11. Water prevention and control of pollution acts was passed in the year **1974**.
12. The most common method used to dump solid wastes is **land filling**.
13. **Diabetes** is not an occupational disease.
14. Fertility means actual **child bearing period**.

15. **Total fertility rate** is a key indicator of good reproductive health of the community.
16. The systematic and scientific study of human populations is known as **demography**.
17. **Laparoscopy** is a spacing method of family planning.
18. **Breastfeeding** is the best way to satisfy the nutritional and psychological needs of the baby.
19. Vaccines produced by modifying disease-producing viruses or bacteria in a laboratory are known as **Live Attenuated Vaccines**.
20. **Immunity** is the power of the body to resist the effect of invasion of pathogenic micro-organisms in the body.
21. Population explosion is defined as the population growth rate of more **than 2 percent** per year.
22. Hormonal pills/Oral contraceptives contain **oestrogens and progesterone**.
23. **Tubectomy is an operation in female**.
24. The programs to get total reproductive health as a social goal of national level are called **family planning**.
25. Establishment of **Green Belt** between industrial and residential areas is essential to prevent air pollution.
26. Lippes loop is **first generation** IUCD.
27. Marijuana is derived from the **Hemp plant**.
28. **Nicotine** is an addictive drug found in tobacco.
29. Copper-T is **second generation** IUCD.
30. The recommended duration for exclusive breastfeeding is **6 months**.
31. The Worlds Health Day is celebrated on **7th April**.
32. **Vasectomy** is a permanent sterilization surgery meant for men.
33. **DPT** is a combined vaccine.
34. Highest percentage of air consists of **nitrogen**.
35. **Contraception** is a process prevention of pregnancy.
36. Air pollution causes **respiratory problems**.
37. IUCD stands for **intrauterine contraceptive device**.
38. **Carbon dioxide** is a Green House gas.
39. **Coitus interruption** is a natural method of family planning.
40. **Silicosis** is an example of occupational illness.

Chapter
3

Nutrition and Health

A Basics of Nutrition

B Importance of Water and Fibre Diet

C Junk Foods, Fortification of Foods

D Food Safety, Adulteration, Artificial Ripening, Pesticides, Genetically Modified Foods

E Dietary Supplements, Nutraceuticals, Food Supplements, Drug–Food Interactions

A

Basics of Nutrition

1 Define the terms "nutrition" and "food". Mention the functions of food.

☞ Nutrition

Nutrition is a process in which the food is utilized for nourishing the body.

WHO in 1971 defined nutrition as follows:

"It is the science of food and its relationship to health."

Food

A food may be defined as any substance which when taken into the body can be utilized to provide heat or energy to maintain and compensate wear and tear of the tissues and to regulate body processes.

Functions of Food

- It provides energy to the body in the form of heat for mechanical work.
- It is essential for the growth of the body and for the repair of damaged tissues.
- It is essential for maintenance and regulation of tissue functions and body temperature.
- It provides the power to the body to build resistance against infections and diseases.
- It is essential to satisfy hunger.

2 Give the classification of food materials.

☞ Classification of Food

- On the basis of function:
  i. Energy yielding foods, e.g. cereals sugars, roots, oils.
  ii. Body building foods, e.g. meat, egg, fish and pulses.
  iii. Protective foods, e.g. vegetables, fruits, milk.
- On the basis of origin:
  i. Animal origin, e.g. eggs, fish, meat.

ii. Plant origin, e.g. vegetables, fruits.
iii. Mineral origin, e.g. mineral salts.

- According to chemical composition:
  i. Carbohydrates
  ii. Proteins
  iii. Fats
  iv. Vitamins
  v. Minerals.
- On the basis of nutritive value:
  i. Cereals and millets (carbohydrates, proteins).
  ii. Pulses (proteins, minerals).
  iii. Vegetables (minerals, vitamins).
  iv. Fruits (minerals, vitamins).
  v. Animal foods (proteins, fats, vitamins).
  vi. Fats and oils (fats, vitamins A and D).
  vii. Sugar and jaggery (carbohydrates, iron).
  viii. Condiments and spices (act as carminatives and digestants).
  ix. Miscellaneous food articles.

3 Define proteins. Give the sources and mention the functions of proteins. (S. 22, 24, W. 23)

☞ **Proteins**

"The proteins are complex organic nitrogenous compounds made up of amino acids and are necessary for overall growth and repair processes of body tissues."

Sources of Proteins

Fish, liver, meat, pulses, milk, egg, nuts, soya bean.

Functions of Proteins

- Proteins are required for body building.
- Repair and maintenance of body tissues.
- Maintenance of osmotic pressure.
- Synthesis of substances like plasma proteins haemoglobin.
- Production of heat and energy like carbohydrates.

4 What do you mean by essential and nonessential amino acids? Give five examples of each.

☞ **Essential Amino Acids**

The amino acids which cannot be synthesized in the body but are badly required for normal functioning are called essential amino acids, e.g. leucine, isoleucine, arginine, histidine, valine, phenylalanine.

Nonessential Amino Acids

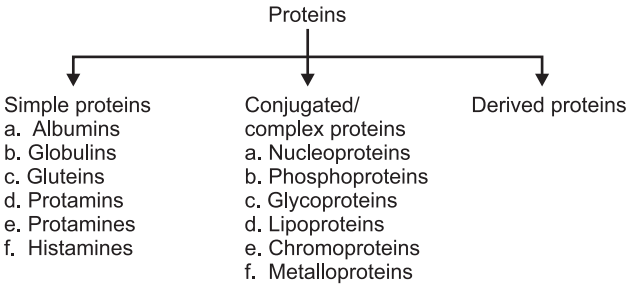
The amino acids which are synthesized in the body but are not very essential for normal functioning are called nonessential amino acids, e.g. alanine, proline, tyrosine, glycine, cystine, serine.

5 What are proteins? Give the classification of proteins giving suitable examples.

☞ Proteins

The proteins are complex organic nitrogenous compounds made up of amino acids and are necessary for overall growth and repair processes of body tissues.

Classification of Proteins



6 What are amino acids? Classify them with examples. Mention the functions of amino acids.

☞ Amino Acids

Amino acids are the building blocks of proteins.

Classification of Amino Acids

- Neutral amino acids, e.g. glycine, alanine, valine.
- Basic amino acids, e.g. lysine, arginine, histidine.
- Acidic amino acids, e.g. aspartic acid, glutamic acid.
- Imino acids, e.g. proline, hydroxyproline.

Functions of Amino Acids

- Amino acids are required for synthesis of various enzymes, hormones, plasma proteins and immunoglobulins.
- For growth and repair of body tissues.
- As a source of energy when body is having inadequate supply of carbohydrates or fats.

7 What is kwashiorkor disease? Give its symptoms and mode of treatment. (W. 23)

☞ Kwashiorkor Disease

It is a protein deficiency disease occurring commonly in the children. It is characterized by qualitative and quantitative deficiency of proteins.

Causes/Contributory Factors of Kwashiorkor

- Large family size.
- Poor health of mother.
- Premature termination of breastfeeding.
- Poor environmental condition.
- Delayed supplementary feeding.
- Use of diluted cow's milk to the infants or children.

Symptoms/Effects of Kwashiorkor

- Retarded growth.
- Oedema.
- Changes or alteration in pigmentation of skin and hair.
- Changes in texture of skin.
- Enlargement of liver.
- Hypoalbuminaemia.
- GIT disturbances.
- Psychic changes.
- Hypoglycaemia.
- Stools containing much higher quantity of undigested food.

Other Symptoms

- Macrocytic anaemia.
- Normocytic anaemia.
- Decreased BMR.
- Fall in body temperature.
- Fall in plasma levels of triglycerides cholesterol.

Treatment for Kwashiorkor

- Supply of diet rich in protein.
- First choice milk and egg should be given both being rich in proteins.
- Soya beans are best known vegetarian source of first class as well as second class proteins.
- Food from nonvegetarian source like liver, meat, sea food.

- In severe condition blood transfusions are required.
- The use of preventive measures is the best way for avoiding this disease.

8 What is marasmus disease? Give its symptoms and treatments. (W. 23)

☞ Marasmus Disease

It is the protein deficiency disease commonly found in infants below 1 year of age.

Causes

- It is mainly caused due to deficiency of proteins and carbohydrates with some other nutritional factors.
- Proteins and energy deficiency disease of such type is also known as marasmic kwashiorkor.
- It is commonly found in people in absence of maintaining proper diet.
- Early stop breastfeeding.

Symptoms

- Retarded growth.
- Complete loss of body fat.
- Weakness.
- Changes in texture of skin.
- GIT disturbances.
- Oedema.
- Alteration in pigmentation of skin and hair.

Treatments

- Providing diet rich in calories.
- Providing protein diet.
- Other nutritional factors is best course of prevention and cure of marasmus.

9 What do you mean by complete and incomplete proteins? Give examples.

☞ Complete Proteins

Proteins which contain all the essential amino acids in required quantities are called complete proteins, e.g. milk proteins, egg proteins.

Incomplete Proteins

Proteins which do not contain all essential amino acids are called incomplete proteins, e.g. gelatin, zein of maize.

10 What is "malnutrition"? Explain protein-energy malnutrition (PEM). (S. 22)

☞ Malnutrition

Malnutrition is defined as the lack of necessary or proper food substances in the body or defective absorption and distribution of them.

Protein-energy Malnutrition (PEM)

- Protein-energy malnutrition (PEM) is supposed to be a major health problem in India.
- It is common among children during the first few years of life.

Causes of PEM

- Consumption of food inadequate in quantity and quality.
- Infections like diarrhoea, respiratory infections, intestinal worms.
- Decrease in absorption and utilization of proteins.

Clinically the protein-energy malnutrition is manifested in two forms:

i. Kwashiorkor disease and ii. Marasmus disease.

11 What are carbohydrates? Explain the role of carbohydrates in our food.

☞ Carbohydrates

Carbohydrates are the compounds of carbon, hydrogen and oxygen and are chemically polyhydroxy aldehydes or ketones or compounds derived from them, e.g. glucose, fructose, galactose, sucrose, maltose, lactose, starch, cellulose.

Role of carbohydrates in our foods is:

i. *Cellulose*: It is a dietary fibre and important content and diet found in vegetables, fruits and grains.
   - – It increases the bulk of stool and reduces the tendency for constipation.
   - – These fibres also possess cholesterol lowering activity.
   - – Excretion of minerals in stool is increased by high fibre diet.

ii. *Starch*: The largest proportion of carbohydrates in our diet occurs as starch. Plants store the greatest part of their food reserve as starch. The dietary sources of starch are cereals, potatoes, unripe fruits.

iii. *Glycogen*: It is the carbohydrate of animal origin which is deposited in liver and muscles. The glycogen reserve of human adult is about 500 grams.

12 What are fats? Give the sources and functions of fats. Or Define and classify lipids. Give functions of lipids.

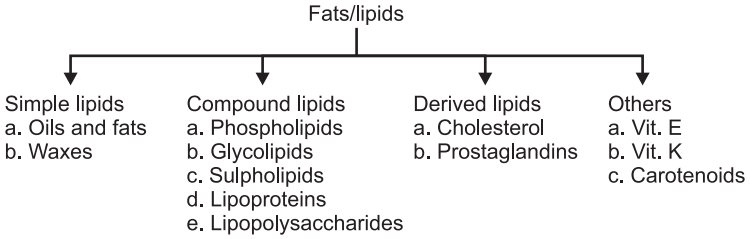
☞ Fats or Lipids

Fats or lipids are compounds of glycerol with fatty acids. Fats are solid up to 20°C and if they are liquid at that temperature are called oils.

Sources of Fats/Lipids

Coconut oil, palm oil, cotton seed oil, groundnut oil, fish oil, sesame oil, soya bean oil.

Classification of Fats/Lipids



Functions of Fats/Lipids

- Fats are high energy foods (source of energy).
- Act as a vehicle for fat soluble vitamins like A, D, E, K.
- As an insulator of organs of cell.
- Building blocks for membranes.
- Support viscera like heart, kidneys and intestine.

13 Define minerals. How are minerals classified? Give the basic functions of minerals.

☞ Minerals

Minerals are various elements which are required for metabolic functions in the body, e.g. calcium, phosphorus, sodium, potassium, iron, iodine.

Classification/Types of Minerals

- Macrominerals/macroelements/principle elements/macro-nutrients: The minerals which are required in large quantities

for human body with respect to daily requirement are called macroelements, e.g. Ca, P, Na, K, Mg, Fe, Zn.

- Microelements/microminerals/trace elements/micronutrients: The minerals which are required in very less quantities (trace quantities) for the human body with respect to daily requirements are called microminerals/trace elements, e.g. Co, Cu, I, Se, Mn.

14 State the basic functions of minerals present in the body.

☞ The minerals are needed for:

i. Maintenance of osmotic pressure of blood (Na^+, K^+, CL^-).
ii. Transport of oxygen (Fe).
iii. Growth and maintenance of tissues and bones (Ca^{++}).
iv. Working of nervous system (Ca^{++}).
v. Muscle contraction (Ca^{++}).
vi. Maintenance of electrolyte balance (Na^+, K^+).
vii. Acid–base balance.
viii. Blood coagulation (Ca^{++}).
ix. Cardiac activity (Ca^{++}).
x. Maturation of sperms (Zn).
xi. Thyroid hormone synthesis (I).

15 Give the requirements, deficiency effects, sources and importance/functions of the following minerals in human body (*see* table on the next page).

Minerals	*Sources*	*Requirements*	*Deficiency disorders*	*Functions/role/importance*
1. Calcium	Milk, egg, leafy vegetables	Adults: 400–500 mg/day Infants and children 500–600 mg/day	Rickets, osteoporosis, hypocalcaemia osteomalacia tetany	i. For formation and maintenance of growth of bone ii. For formation of tooth iii. For blood clotting iv. For absorption of vitamin B_{12} v. For contraction of muscles vi. For activation of enzymes vii. For accessibility of nerve fibres
2. Phosphorus	Foodstuffs	Adult: 0.8 gm/day Infants/children: 0.2 to 0.3 gm/day	Hypophosphataemia, rickets, osteomalacia	i. For formation of developments of bones and teeth ii. For formation of phospholipids, nucleic acids iii. It forms coenzymes like NADP, ADP, AMP, ATP iv. It is required in the absorption of glucose by phosphorylation
3. Sodium	Fish, meat, milk, table salt	Adult: 10–15 gm/day	Hyponatremia, Addison's disease	i. For maintenance of osmotic pressure ii. For retaining water in the body iii. For neuromuscular junction activity

Contd...

Minerals	*Sources*	*Requirements*	*Deficiency disorders*	*Functions/role/importance*
				iv. For flexibility of nerves v . For acid–base balance vi. For maintenance of viscosity of blood vii. To maintain electrolyte balance
4. Iodine	Sea fish, cod liver oil, seaweed, milk, meat, cereals, vegetables	Adult: 50 gm/day	Goitre cretinism, hypothy-roidism	i. For biosynthesis of thyroid hormones ii. For growth and development of body
5. Iron	Liver, meat, poultry, fish, cereals, green leafy vegetables, nuts, jaggery, dry fruits	Adult: 2–6 gm/day	Iron deficiency, anaemia, haemochromatosis	i. For treatment of anaemia ii. As a haematinic

16 What are vitamins? How are they classified?

☞ Vitamins

Vitamins are the organic compounds which are found in natural foodstuffs and essential for normal growth and metabolic functions of the body.

Classification of Vitamins

- *Fat soluble vitamins*: Vitamins A, D, E, and K.
- *Water soluble vitamins*:

i. Vitamin C (ascorbic acid)

ii. Vitamin B complex:

- Thiamine (B_1)
- Riboflavin (B_2)
- Niacin (B_3)
- Pyridoxin (B_6)
- Pantothenic acid
- Biotin
- Folic acid
- Lipolic acid (PABA)
- Cyanocobalamin (B_{12}).

17 Give the sources, daily requirements, deficiency effects, role/functions of following vitamins (see table on the next page).

Vitamins	*Sources*	*Requirements per day*	*Deficiency effects*	*Role/functions*
1. Vitamin A	Fish, liver, butter ghee, whole milk, fish,	Adult: 750 µg Children: 250 to 600 µg	Night blindness, conjunctival xerosis, Bitot's spot, xerophthalmia	i. To maintain visual activities ii. Normal functioning of epithelial tissues and glands iii. Supports normal growth of skeleton iv. Anti-infective action
2. Vitamin D	Fish, liver oil animal fat	Adults: 25 µg Infant/children 5.00 µg	Rickets, osteomalacia	i. Promotes normal growth and development of bone ii. Promotes absorption of calcium and phosphorus iii. Allows maturation of collagen and collagenous tissue iv. It promotes overall normal growth of the body
3. Vitamin C	Fresh citrus fruits, green leafy vegetables, amla	Adult: 65–90 mg/day Infant/children: 15–45 mg/day	Scurvy	i. Helps to prevent skin lesions and infections like scurvy ii. Increases the resistance of the body against infection iii. Keeps the gums and teeth healthy iv. Necessary for normal tissue oxidation physiology v. Acts as a coenzyme

Contd...

Vitamins	*Sources*	*Requirements per day*	*Deficiency effects*	*Role/functions*
				vi. Required for absorption of iron vii. Helps in wound healing process
4. Vitamin B_1 (thiamine)	Yeast, pulses, oilseeds, nuts, cereals	0.5 mg/100 kcal/day	Beriberi, dry beriberi, wet beriberi, infantile beriberi, cerebral beriberi	i. For the treatment of beriberi ii. Involved in synthesis of acetylcholine iii. Acts as a coenzyme
5. Vitamin B_2 (riboflavin)	Liver, meat, eggs, milk	0.6 mg/1000 kcal/day	Corneal ulcers, cataracts, photophobia	i. Acts as a coenzyme ii. Involved in metabolism of proteins, fats and carbohydrates iii. To treat a riboflavinosis
6. Niacin	Liver, ground-nut, whole cereals, pulses meat, fish	6.6 mg/1000 kcal/day	Pellagra	i. In treatment of pellagra ii. As antihyperlipidemic agent iii. As a vasodilator iv. Essential for normal functioning of skin, intestine, etc.
7. Vitamin B_{12} (cyanoco-balamin)	Liver, kidney meat, fish, eggs, milk, cheese	Adult: 1 mg/day Children: 0.2 to 1 mg/day	Megaloblastic anaemia, pernicious anaemia	i. Required for normal develop-ment and maturation of RBC ii. As a coenzyme iii. Required for conversion of RNA into DNA

18 What is balanced diet? Give the composition of balanced diet. What are the common deficiencies/faults in Indian diet? Give WHO recommendation of balanced diet. Mention importance of balanced diet. (W. 22, S. 24)

☞ Balanced Diet

A balanced diet is defined as one which contains variety of foods in such quantities and proportions that the need for energy, amino acids, vitamins, minerals, fats, carbohydrates and other nutrients is adequately met for maintaining health, vitality and general well-being and also makes a provision for extra nutrients to withstand short duration of leanness.

A balanced diet has become an accepted means to safeguard a population from nutritional deficiencies.

Composition of Balanced Diet

- Fats—20 to 30%.
- Carbohydrates—50–70%.
- Vitamins.
- Minerals.
- Proteins—meat, liver fish, milk, pulses.
- Foods rich in vitamins and minerals—milk, eggs, liver, fruits.
- Foods rich in carbohydrates and fats—cereals, sugar, roots, tubers.

In Indian diet common deficiencies are lower proteins, fats, carbohydrates, vitamins, amino acids and other substances which are essential for balanced diet.

In addition, a balanced diet should also contain sufficient amounts of water and roughage material. The balanced diet (food) should satisfy the taste and desire of a person.

☞ WHO Recommendations about Balanced Diet:

1. Eat roughly the same amount of calories that your body is using. A healthy weight is a balance between energy consumed and energy that is "burnt off".
2. Limit intake of fats and prefer less unhealthy unsaturated fats to saturated fats and trans fats.
3. Increase consumption of plant foods, particularly fruits, vegetables, legumes, whole grains and nuts.

4. Limit intake of sugar (less than 10% simple sugars are recommended).
5. Limit the salt/sodium consumption from all sources and ensure that salt is iodized.

Other recommendations include:

- Essential micronutrients such as vitamins and certain minerals.
- Avoid directly poisonous (e.g. heavy metals) and carcinogenic (e.g. benzene) substances.
- Avoid foods contaminated by human pathogens (e.g. *E.coli*, tapeworm eggs).

☞ Importance/uses of balanced diet/healthy diet:

- A healthy diet is one that helps to maintain or improve overall health.
- A healthy diet provides the body with essential nutrition.
- A healthy diet supports energy needs.
- Proper healthy diet is important for lowering health risks, such as obesity, heart diseases, diabetes, cancer, etc.

19 Explain the terms.

a. Night Blindness

It is an inability to have vision in dimlight and during dark due to impairment in dark adaptation of eyes. It is caused due to deficiency of vitamin A.

In children, additional defects like recurrent infections and diarrhoea may be observed.

b. Pellagra

It is caused due to deficiency of niacin (vitamin B_3).

Symptoms

i. Dermatitis
ii. A sore
iii. Dark-coloured tongue
iv. An inability to digest and assimilate food
v. Skin rash, itching.

c. Scurvy

It is deficiency disorder caused due to vitamin C.

Symptoms

i. Defective formation of collagen fibres of connective tissues.
ii. Formation of bone is also abnormal.

iii. Bleeding occurs.
iv. Pinpoint haemorrhages in the skin.
v. Bleeding from gums and teeth.
vi. Slow wound healing
vii. Slow healing of fractured bones.

d. Egg White Injury

It is a deficiency disorder caused due to vitamin 'biotin'. Biotin has a strong affinity with avidin (egg white protein). Excess consumption of raw eggs results in deficiency of biotin called egg white injury.

This biotin–avidin complex is not absorbed during digestion and hence produces deficiency of biotin.

Symptoms

i. Nausea
ii. Anorexia
iii. Dermatitis
iv. Pains in muscles
v. Fatigue.

e. Beriberi

It is a deficiency disorder of vitamin B_1 (thiamine). There are four types of beriberi.

i. ***Dry beriberi*****:** It is a nutritional deficiency. The main reason behind this is consumption of polished rice and refined cereals.

Symptoms

– Degeneration and demyelination.
– Edema of face and legs.
– Pericardial pains.
– Palpitation.
– Numbness in legs.
– Tenderness in the calf muscles.

ii. ***Wet beriberi*****:** It is mainly characterized by edema. Reason behind edema is cardiac failure.

Symptoms

– Rapid and notable edema develops involving face, legs, trunk and serous cavities.
– Breathlessness.
– Palpitation.
– Rise in systolic BP.
– In severe condition patient may die due to acute circulatory failure.

iii. ***Infantile beriberi*:** It occurs in breastfed infants, usually between 2 and 5 months of age. Reason behind is mother consuming thiamine deficient diet and secreting milk with low thiamine content. It is very acute condition and can be fatal (toxic).

Symptoms

– Restlessness in infants.
– Infant cries a lot and passes very less urine.
– Edema develops.
– Dysphonia.
– Tachycardia.
– Infant may die within 24 to 48 hours.
– Convulsion and coma.

iv. ***Cerebral beriberi*:** This disease is resultant of acute biochemical lesions in the brain due to thiamine deficient diet.
It is further leading to abnormal metabolism in the brain.

Reasons behind cerebral beriberi

– Alcoholism.
– Carcinoma in stomach.
– Pregnancy toxaemia.
– Prolonged vomiting.
– Diarrhoea.

Symptoms

– Vomiting.
– Psychiatric disorders like disorientation, faulty memory.
– Loss of pupillary reflex.
– Loss of extraocular movements.
– Polyneuritis.

20 Discuss in brief various nutrition-related programmes developed by Government of India.

☞ The Government of India has developed various nutrition-related programmes to counter the problem of malnutrition in India. These programmes are as follows:

i. *Vitamin A prophylaxis programme*: It helps for the control of blindness and involves administration of a single massive dose of oily preparation of vitamin A containing 200,000 IU.

ii. *Prophylaxis against nutritional oedema*: It involves distribution of iron and folic acid tablets.

iii. *Control of iodine deficiency disorders*: It involves replacement of edible salt by iodized salt.

iv. *Special nutrition programmes*: It was started for the benefit of children below 6 years of age, pregnant and nursing mothers in urban slums, tribal areas and backward rural areas.

v. *Balwadi Nutrition Programme*: It is mainly for children in the age group of 3 to 6 years in rural areas.

vi. *Mid-Day Meal Programme*: Its objective is to attract more children to schools and retain them. It involves in providing them balanced diet.

21 What is ORS/ORT? Give its composition and mention its uses.

ORS/ORT means 'oral rehydration salt' or 'oral rehydration therapy'.

- These are orally administered electrolyte solutions used to supply water and electrolytes needed to the patients.
- Composition of ORS/ORT

i.	Sodium chloride	3.5 gm
ii.	Potassium chloride	1.5 gm
iii.	Sodium bicarbonate	2.5 gm
iv.	Glucose	20 gm

- This mixture is added in 1 litre of water and then taken by oral route.
- Uses of ORS/ORT: It is the first aid remedy in condition of dysentery, diarrhoea, prolonged fever, vomiting, etc.

B

Importance of Water and Fibre Diet

1 Give the importance of water and fibre in diet.

☞ **(A) Importance of Water in Diet:**

1. Water is an important for all body functions and processes including digestion and elimination.
2. Drinking water is important during weight loss because it provides hydration without unwanted calories.
3. Water regulates body temperature.
4. Water transports nutrients in the digestive system, the blood and inside cells.
5. Water helps to eliminate waste in urine and faeces.
6. Water hydrates skin.
7. The combination of water and fibre prevents constipation.

(B) Importance of Fibres in Diet: **(S. 23)**

1. Diet rich in fibre can help in digestion and prevent constipation.
2. Dietary fibres increase the weight and size of stool and softens.
3. Fibre is the fuel of colon cells and helps to keep them healthy.
4. Dietary fibres, found particularly in vegetable fruits, beans and wholegrains, help to keep bowel movements regular.
5. Some fibres are prebiotics, thus they are fermented by the healthful beneficial bacteria.
6. Fibres are good for the GIT because it provides bulk to the stools, helping in caloric lubrication and transit.
7. Consumption of fibre rich food reduces appetite which helps in reducing body weight.
8. High fibre in diet improves gastrointestinal health, improves glucose tolerance, reduces hyperlipidemia, hypertension, etc.

2 What are "Dietary fibres"? Give the sources and types/ components of dietary fibres.

☞ **Dietary Fibres:**

- Dietary fibre is defined as "the components of plants that resist human digestive enzymes, that includes lignin and carbohydrate".
- Dietary fibre or roughage is the indigested portion of food derived from plant.
- The main role of fibre is to keep the digestive system healthy.
- Dietary fibres have three primary mechanisms: Bulking, viscosity and fermentation.

☞ **Types and Sources of Dietary Fibres:**

(A) Soluble Fibres

These fibres dissolve in water and is readily fermented in the colon into gases and physiologically active by-products and is viscous in nature.

- **Sources of soluble fibres:**
  - Legumes, e.g. peas, soya beans.
  - Oats, rye, chia and barley.
  - Fruits, e.g. berries, ripe bananas, apples
  - Vegetables, e.g. broccoli, carrots.
  - Root tubers and root vegetables, e.g. sweet potatoes, onions.
  - Psyllium seed: Husks and flax seeds.
  - Nuts, with almonds being the highest in dietary fibre.

(B) Insoluble fibres

These fibres do not dissolve in water, and are metabolically inert and provide bulking in large intestine. Bulk fibres absorb water as they move through the digestive system, promote easy defaecation.

- **Sources of insoluble fibres:**
  - Wholegrain foods.
  - Wheat and corn bran.
  - Legumes such as beans and peas.
  - Nuts and seeds.
  - Potato skin.
  - Lignans.
  - Vegetables such as green beans, cauliflower.
  - Some fruits including avocado and unripe bananas.
  - The skin of some fruits, including kiwi fruit, grapes and tomatoes.

C

Junk Foods, Fortification of Foods

1 What is "junk food"? Mention the ill effects of junk food. (S. 22, W. 22, 23)

☞ **Junk Food:**

Definition: Junk food is unhealthy food that is high in calories from sugar or fat, with a little dietary fibre protein, vitamins, minerals or other important forms of nutritional value.

- The term junk food was coined as a slang in the public interest in 1972.
- The foods with poor nutritive value are considered as unhealthy and are called junk foods.
- Junk food is lacking in proteins, vitamins, essential minerals, fibres, etc.
- Examples of junk foods: Cakes and biscuits, hot chips, burgers, pizza, chocolate, sweets, snacks, sugary drinks, alcoholic drinks, fruit juices.

☞ **Ill effects of junk foods/harmful effects of junk foods:**

1. It impairs digestion.
2. It may produce fatigue and weakness.
3. It may lead to depression in teenagers.
4. It causes fluctuations in blood sugar levels.
5. It affects brain function (memory and learning problems).
6. It increases risk of heart diseases.
7. It can cause kidney diseases
8. It can damage liver.
9. It increases risk of cancer.
10. It can cause type 2 diabetes.

☞ **Causes of consumption of junk food (appealing factors):**

1. **Time factor:** Items of junk food are easy to prepare and ready to consume within no time.
2. **Taste factor:** Variety of tastes may create a specific feelings and thus people may prefer it.
3. **Attractiveness:** Attractive packing, additives, colours and flavour may lead to more acceptance and consumption of junk food.
4. **Advertising factor:** Children and adolescents are more attracted towards junks foods as their advertisements are much impressive to the minds of the kids.

2 What are the measures to be taken to avoid junk food?

The only way to avoid junk food is to encourage eating healthy snacks and foods (health diet)

The following type of healthy snacks and food is consumed.

1. Food that is low in fat, saturated fat and cholesterol.
2. High-fibre foods, including wholegrain foods, vegetables and fruits.
3. Foods with low amount of sugar and salt.
4. Calcium-rich foods to meet daily calcium requirements.
5. Iron-rich foods, to meet daily requirement of iron.

Creating awareness about the bad effects of junk food among the people is one of the best ways to avoid the consumption of junk foods.

☞ **Measures to be taken for children to avoid junk food:**

1. Try to avoid the children to get habituated to such foods.
2. Controlling children from eating junk foods in schools.
3. Cares to be taken by school administration along with parent to avoid availability of junk food in school premises.
4. Keeping the good food nearby the children.
5. Maintaining meals at right time to the children which avoid the children from junk foods.
6. Developing awareness for fitness will maintain good diet habits.
7. Educating parents about harmful effects of junk foods.
8. “Bringing fruits at schools” like ideas will cut down the consumption of junk food.

3 What do you mean by "fortification of food"? Give advantages, disadvantages of "fortification of food". Give the WHO guideline of food fortification.

☞ **Fortification of food:**

- WHO defined: "The process whereby nutrients are added to food to maintain or improve the quality of the diet of group, community or population".
- Fortification food is defined as the practice of adding vitamins and minerals to commonly consumed foods during processing to increase their nutritional value.
- Fortification means supplying necessary contents along with regular food.

☞ **Advantages/importance of fortification of food**

1. Fortified food can help to maintain healthy micronutrient levels to keep the bones strong.
2. Fortified food helps to improve digestion and prevent heart diseases.
3. Fortified food prevents nutrition related illness.
4. Need of fortified food is more for pregnant women than normal because they are feeding a growing baby.
5. To balance the total nutrient profile of a diet.
6. They help children to grow.
7. They help with dietary needs.
8. Providing nutrients through the regular food supply and distribution system reduces cost.

☞ **Disadvantages of fortified food:**

1. Shelf life of certain products is reduced (fortified milled cereals).
2. Regular quality control is essential.
3. Prolonged cooking of fortified food leads to 90% loss of vitamin C.
4. Fortified commodity is more expensive.
5. Possibility of over-consumption of a nutrient by a particular group.

☞ **Methods of food fortification:**

1. Commercial and industrial fortification.
2. Biofortification.
3. Home fortification.

☞ WHO guidelines on food fortification with micronutrient in 2006:

- The role of food fortification in the control of micronutrient malnutrition.
- Evaluating the public health significance of micronutrient malnutrition.
- Fortification: Physical characteristics, selection and use with specific food vehicles.
- Implementing effective and sustainable food fortification programmes.

☞ The micronutrients involved in fortification are as follows:

(a) Iron, vitamin A and iodine.
(b) Zinc folate, vitamin B_{12} and other B vitamins, vitamin C, vitamin D, calcium, selenium, and fluoride.

☞ Fortification of food under the government supported programmes:

(a) Fortification of ICDS supplementary cooked food.
(b) Fortification of food for the mid-day meal.
(c) Fortification of factory produced ready-to-eat (RTE) foods.
(d) Fortification or wheat flour supplied through targeted public distribution system (TPDS).

D

Food Safety, Adulteration, Artificial Ripening, Pesticides, Genetically Modified Foods

1 What is food safety? Describe various ways of food safety. (S. 23)

☞ Food Safety

"Food safety is a scientific discipline describing handling, preparation, storage and serving of food in a ways that prevent foodborne illness".

- Food safety is most important, if it is not followed, may lead to food poisoning and foodborne diseases.
- Food contamination refers to food that is spoiled by biological, chemical or physical properties.
- Food safety is the assurance given to the customer that the food will not cause any harm when consumed.
- The food should be free from contaminants like bacteria, virus, chemicals and foreign particles.

There are three levels of responsibilities through which food safety can be maintained.

(a) The employers responsibility

- Have a safety plan.
- Have a cleaning and sanitation plan.
- Provide training.
- Provide supervision.
- Inspect the workplace.
- Provide first aid.
- Provide personal protective equipment.

(b) The empolyee's responsibility

- Practice safe food handling.
- Working safety.
- Using the personal protective equipment.
- Informing the employer about hazards, accident or injury.
- Refuse to do a task where there is undue risk of injury or disease.

(c) Consumer responsibility

- People having allergies of certain foods may avoid those food.
- Customer should be aware of any allergy to food.
- A customer is ultimately responsible for knowing what they are eating.

2 What is food adulteration?

☞ Food Adulteration:

"Food adulteration means the act of intentionally debasing the quality of food by either adding or replacing the food substances with non-drug or alternative components".

☞ Reasons/Causes of Food Adulteration:

- To take maximum profit from food items by fewer investments.
- High population food demand and its changing trends.
- Lack of consciousness of people for food consumption.
- Lack of effective food laws.

☞ Adulterant:

An adulterant is a substance found in the food that affects the safety or effectiveness of the said substance.

Adulterants can be broadly classified as follows:

1. Poisonous or deleterious substances.
2. Filth and foreign matter of adulteration.
3. Economic adulteration.
4. Microbiological contamination and adulteration of food.

☞ Examples: Adulterants Found in Food:

Food component	*Adulterant*
1. Asafoetida	Resin and colour
2. Black pepper	Papaya seeds
3. Coffee powder	Cereal starch

4. Coriander powder	Saw dust
5. Dry red chilli	Rhodamine B colour
6. Green vegetables	Malachite green
7. Turmeric powder	Metanil yellow colour

3 What is 'artificial ripening'? What is the effect of artificial ripening? (W. 22, S. 24)

- **Ripening:** Ripening of fruit is a physiological process which make them edible, palatable and nutritious.
  Ripening of fruits is a chemical change which is beneficial for mankind. In ripening of fruits, the chemical composition of fruit changes and it is irreversible.
- **Artificial ripening:** When artificial substances are used to accelerate the ripening of fruits, the process is called "artificial ripening".

Examples of artificial ripeners:

- Calcium carbide (CaC_2) is popularly known as "Masala".
- Acetylene gas.
- Ethephon.
- Ethylene.
- Ethylene glycol.

☞ Effects of Artificial Ripening:

1. Fruits ripened with calcium carbide are inferior in taste and flavour.
2. It also shortens shelf life of fruits.
3. Calcium carbide is dangerous and corrosive chemical which may cause several harmful effect on human health.
4. It can cause stomach upsets and disrupts intestinal functions.
5. Artificially ripened fruits may change the texture, taste, colour of the fruit.
6. Calcium carbide contains traces of arsenic and phosphorus hydride which may produce arsenic or phosphorus poisoning.

4 What are pesticides? Write in brief about use of pesticides.

☞ Pesticides:

Pesticides are the substances used for destroying insects or other organisms harmful to cultivated plants or to animals.

- Pesticides are chemical compounds that are used to kill pests, including insects, rodents, fungi and unwanted plants (weeds).

Pesticides can be broadly classified as:

1. Insecticides: Used to kill insects
2. Herbicides: Used to kill the weeds
3. Rodenticides: Used to kill rodents (rats and mice)
4. Bactericides: Used to kill bacteria
5. Fungicides: Used to kill fungi
6. Larvicides: Used to kill larvae.

☞ Uses/Benefits/Advantages of Pesticides:

- To increase food productivity.
- Pesticides enable farmers to produce safe and quality foods at affordable prices.
- Pesticides can help to improve growth behaviour of crops.
- They give higher crop yields and can help to reduce global hunger.
- Increases profit for farmers.
- Newer pest control methods are safer and more effective than older ones.

☞ Disadvantages of Pesticides:

- Financial burden for farmers.
- Pollute the environment.
- Negative impact on wildlife.
- Human health hazards.
- Groundwater pollution.
- Pesticide poisoning.

☞ Effects of Pesticides/Hazards of Pesticides on Human Health:

- Irritation to skin and eyes.
- Birth defects.
- Vomiting, diarrhoea, slow heart rate.
- Liver damages.
- Nervous system damage.
- Cancers, Alzheimer's disease.
- Endocrine damage: Thyroid, hormonal, reproductive and metabolism.
- Skin rashes.
- Blindness.

5 Write a note on "Genetically Modified Food" (GMF).

- **Genetic modification:** Genetic modification involves altering an organism's DNA.
- **Genetically modified food (GMF):** Genetically modified foods are the foods derived from organisms whose genetic material (DNA) has been modified in a way that does not occur naturally.
- **Examples of genetically modified crops:** Cotton, potato, papaya, canola, alfalfa.
- **Advantages of genetically modified (GM) crops:**
  1. Genetically modified crops contain more nutrients.
  2. They grow faster.
  3. Desired change can be achieved in very few generations.
  4. Allows greater precision in selecting characteristics.
  5. Increased crop yields.
  6. Reduced cost of food production.
  7. Reduced need of pesticides and herbicides.
  8. Enhanced nutrient composition and food quality.
  9. Resistance to pests and disease.
  10. Greater food security.

• Disadvantages of genetically modified crops:

(1) Environmental:

It includes harming of beneficial species.

(2) Health:

It may cause allergic reactions, antibiotic resistance, decreased nutrients, etc.

(3) Allergen:

It could produce known or unknown allergens.

(4) Antibiotic resistance

(5) Decreased nutrients:

Decreased levels of important nutrients.

(6) Introduction to toxins:

Residual toxins resulting from introduced genes.

(7) Markets:

Unintended market impacts include lower prices and higher cost for farmers as well as low premiums and markets.

E

Dietary Supplements, Nutraceuticals, Food Supplements, Drug–Food Interactions

1 Write a note on "dietary supplements".

☞ **Dietary Supplements:**

"Dietary supplements are the products that contain one or more ingredients (such as vitamins or amino acids) that are intended to supplement one's diet and are not considered as food".

- Dietary supplements include vitamins, minerals, or substances such as herbals, botanicals, amino acids, enzymes and animal extracts.
- Dietary supplements are marketed in variety of forms including tablets, capsules, gummies, powders soft gels, gel caps as well as soft drinks and energy bars.
- Popular supplements include—vitamin D, vitamin B_{12}, minerals like calcium, iron, probiotics, etc.
- Manufacturers and distributors of dietary supplements are responsible for making sure that their products are safe before they go to market.
- Manufacturers are required to produce dietary supplements in a quality manner and ensure that they do not contain any contaminations or impurities and are labelled accurately.

☞ **Benefits/Advantages from Dietary Supplements:**

1. To maintain general health.
2. To support mental and sports related performance.
3. To provide immune system support.
4. To provide adequate amount of essential nutrients.

5. To improve overall health.
6. To correct nutritional deficiencies.

☞ Disadvantages of Dietary Supplements:

Excessive and improper use of dietary supplements may cause following disadvantages:

1. Headache.
2. Liver damage.
3. Reduce bone strength.
4. Birth defects.
5. Excess iron causes nausea and vomiting.
6. Damage to liver.
7. Vitamin can cause diarrhoea.
8. They are not ideal food substitutes.
9. Tendency of addiction.

2 What are food supplements? Give the indications, benefits/advantages/importance/uses of food supplements. Or Write in brief about "food supplements".

☞ Food Supplements:

A food supplement is defined as any food, the purpose of which is to supplement the normal diet.

- Food supplement includes ingredients like vitamins, minerals, herbs, amino acids and enzymes.
- Food supplements are marketed in dosage forms such as tablets, capsules, soft gels, gel caps, powders, liquids, etc.
- Some of the common food supplements are—calcium, fish oil, ginseng, garlic, vitamin D, ginkgo, green tea, glucosamine, chondroitin sulfate, saw palmetto.

☞ Benefits/Advantages/Importance of Food Supplements:

1. To ensure the body is getting proper nutrients.
2. To maintain general health.
3. To manage body weight.
4. To improve cognitive abilities.
5. To provide better athletic performance.
6. To decrease the chances of dealing with heart diseases.
7. To correct nutritional deficiencies.
8. To boost the immune system.

3 Write a note on "Drug–Food interactions".

☞ **Drug–Food Interactions:**

It is an interaction due to concurrent administration of drug along with food materials.

- The drug–food interactions may be affected by many factors such as age, gender, medical history, body composition, nutritional status, number of medications used.
- The drug–food interactions may vary according to type of medication, form of drug, dosage, site of absorption, route of administration.
- Commonest route of administration of drug is oral or enteral.
- The presence of food in GIT affects bioavailability of drugs by changing ADME of or by changing pharmacological action of drugs.
- Drug–food interactions are either beneficial or harmful.
- Many times the presence of food GIT may change pharmacokinetic or dynamics of drugs.
- The drugs may be diluted due to presence of food and its absorption is delayed. This reduces risk of GIT irritation.

☞ **Examples of Drug–Food Interactions:**

1. Metronidazole taken along with food causes nausea, vomiting, headache can be avoided.
2. MAO inhibitors are contraindicated with tyramine containing foods (cheese, banana, chocolate, milk products) because MAO inhibitors inhibit MAO enzymes which is essential for metabolism of tyramine. Thus, level of tyramine increases and causes hypertensive crises, heart failure.
3. Tetracyclines form complexes with ions like calcium, magnesium, aluminium. Hence, milk or antacids should not be given along with tetracyclines.
4. Iron compounds are less absorbed in presence of food and in absence of food if iron is consumed causes nausea, vomiting. Therefore, iron preparation should be taken at least half an hour after consumption of food.
5. Acidic fruits cause decomposition of erythromycin and reduce its effect.
6. Egg, green vegetables decrease anticoagulant effect of warfarin because of increase in synthesis of vitamin K.

4 What is nutraceutical? Classify nutraceuticals with suitable examples. (S. 24)

☞ Nutraceutical

Nutraceutical is a substance which can be considered as a food or its part which provides medicinal or health benefits including the prevention and treatment of diseases.
Nutraceuticals are biologically active phytochemicals that possess health benefits.

Classification of Nutraceuticals:

Nutraceuticals are classified as:

1. As per natural source

(i) Plants—garlic (*Alium sativum*), tomato (*Solanun lycopersicum*)
(ii) Animals—shark liver oil, cod liver oil
(iii) Mineral—calcium, boron, magnesium, manganese, copper, zinc, phosphorus.
(iv) Microorganisms—bifidobacteria, lactobacilli.

2. As per pharmacological basis

(i) Allergic relief—ginkgo biloba
(ii) Cardiac disease—garlic
(iii) Cancer prevention—flex seeds, green tea
(iv) Cholesterol lowering—garlic
(v) Digestive support—digestive enzymes

3. As per chemical constitution

(i) Inorganic supplements—minerals.
(ii) Vitamin supplements—vitamins.
(iii) Digestive enzymes—enzymes.
(iv) Probiotics—helpful bacteria.
(v) Prebiotics—digestive enzymes.
(vi) Dietary fibres—fibres (oats and dried beans).
(vii) Antioxidants—natural antioxidants.
(viii) Phytochemicals—omega 3-fatty acids, carotenoids, vitamins.

5 Give the importance/therapeutic applications of nutraceuticals.

- Nutraceuticals may increase the health value of our diet and help us live longer.

- Nutraceuticals playing significant role in modifying and maintaining healthy human being.
- Nutraceuticals help to prevent some of the health problems like obesity, sleeping disorders, digestive problems, CVS disorders, cancer, arthritis, blood pressure, osteoporosis, etc.
- Nutraceuticals may have some psychological benefits from doing something for oneself.
- The food products used as nutraceuticals can be categorized as dietary fibres, prebiotics, probiotics and other types of herbal or natural foods.
- Due to nutraceuticals, food industry has becoming progressive sector.

OBJECTIVE QUESTIONS WITH ANSWERS IN BOLD LETTERS

1. A substance needed by the body for growth, energy, repair and maintenance is called as **nutrient**.
2. **Vitamin C** is also known as ascorbic acid.
3. Amino acids are the building blocks of **proteins**.
4. **Vitamin A** is fat soluble vitamin.
5. The science of food and its relationship to health means **nutrition**.
6. **Kwashiorkor's and marasmus** are the protein deficiency disorders occurring commonly in children.
7. Leucine and phenylalanine are **essential amino acids**.
8. Oily fish rich in **omega-3 fatty acids**.
9. **Zinc** is necessary for the maturation of sperms.
10. Vitamin K is necessary for **coagulation of blood**.
11. The mineral **sodium** is essential for the transmission of nerve impulses in the nerve fibres of human body.
12. Calcium is required for **muscle contraction**.
13. Deficiency of vitamin **biotin** causes egg white injury.
14. ORS stands for **oral rehydration salt**.
15. Carbohydrates and fat rich food are classified as **energy supplying foods**.
16. The daily intake of iron in an adult is **2 to 6 gm**.
17. Deficiency of iodine may lead to development of **goitre**.
18. **Scurvy** is a deficiency disorder of vitamin C.

19. Limit of per day salt consumption as per WHO recommendation is **less than 5 gm.**
20. **Rickets** is a deficiency disorder caused due to calcium.
21. Full form of FSSAI is **Food Safety and Standards Authority of India**.
22. Fortification of food involves **supplementary food**.
23. A substance needed by the body for growth, energy repair and maintenance is called **nutrients**.
24. Calcium carbide (CaC_2) is popularly known as **"Masala"**.
25. **Ethylene oxide** is an artificial ripener.
26. Citrus fruits are excellent source of **vitamin C**.
27. **Pesticides** are the substances used for destroying insects or other organisms harmful to cultivated plant or animals.
28. **Vitamin D** is known as the sunshine vitamin.
29. GMF stands for **genetically modified food**.
30. Genetically modifications involve alteration of an organisms **DNA**.
31. **Vitamin A** is most important for healthy vision.
32. Fruits and vegetables are usually considered as good sources of **vitamins and minerals**.
33. **Nutraceuticals** are biologically active phytochemicals that possesses health benefits.
34. A person suffering from high blood pressure should cut down **sodium** intake.
35. A diet containing right amount of energy, carbohydrates, proteins, fats, fibre, vitamins, minerals, and water to fulfil requirement of body is called **balanced diet**.
36. IPM stand for **integrated pest management**
37. The insecticide obtained from the plant neem is **azadirachtin**.
38. **Night blindness** is caused by deficiency of vitamin A.
39. The deficiency of vitamin niacin causes **pellagra**.
40. **Beriberi is** caused by deficiency of thiamine (vitamin B1).

Chapter
4

Introduction to Microbiology and Common Microorganisms

A Introduction to Microbiology

B Epidemiology

C Communicable Diseases

A

Introduction to Microbiology

1 Define the terms microbiology and 'microorganism'. Classify microorganisms.

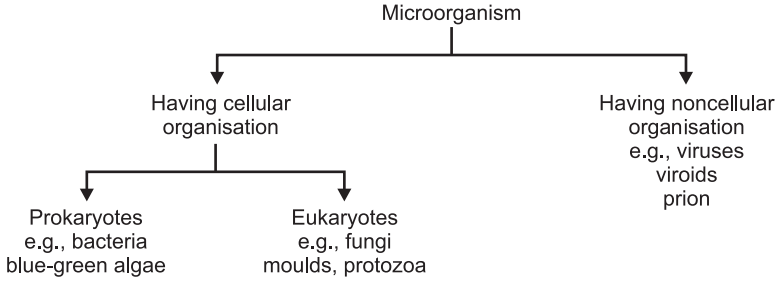
☞ **Microbiology**

Microbiology is the branch of science which deals with the study of identification, structure, physiology, metabolism and reproduction of microorganisms.

Microorganisms

Microorganisms are a heterogeneous group of several distinct classes of living beings.

Classification

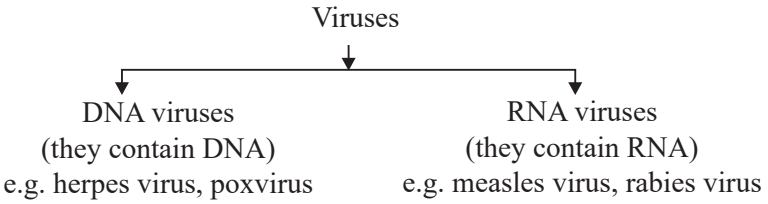


2 Define and classify viruses with examples. Enlist living and nonliving characters of viruses.

☞ **Viruses**

Viruses are noncellular, ultramicroscopic highly infectious agent and possess only one type of nucleic acid.

Classification



Living characters of virus	Nonliving characters of virus
i. They possess nucleic acid and proteins	i. They do not show cellular organisation.
ii. They are capable of reproduction	ii. They carry out their own metabolic activities.
iii. They transmit hereditary characters from generation to generation.	iii. They are inactive outside a host cell.
iv. They are sensitive to chemicals, heat or/and UV rays	iv. They possess either DNA or RNA
v. They are capable of undergoing mutations	v. They can be crystallized like other nonliving chemical substances.

3 What are stains and dyes? What is the purpose of staining? What are the types of staining?

☞ **Stain**

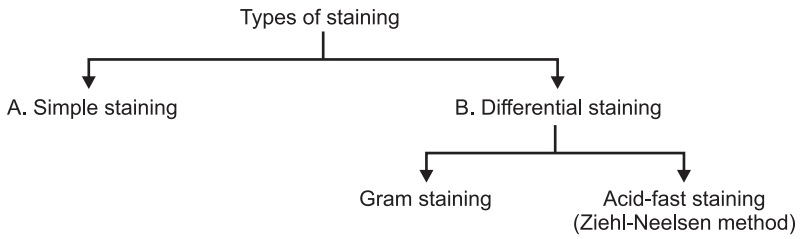
Stains are the organic dyes used for staining the microorganisms.

Examples

Crystal violet, methylene blue, hematoxylin and eosin, carbolfuschin.

Purpose of Staining

- For greater visualization of cells.
- For study of their structures.
- To differentiate the cells.
- To inhibit the growth of some organism so that others can be visualized.



4 Write a note on Gram's staining technique. (S. 22, 23)

Christian Gram developed differential staining technique, to differentiate types of bacteria and their specific structure. Hence called Gram's staining.

Gram Staining Procedure

a. Gram-positive Staining

- First the bacteria are taken and carefully spread on a clean glass dry slide. This is called smear.
- This smear is dried by passing it over a small blue flame. Care should be taken to keep the smear upside.
- Add gentian or crystal violet solution and stain is allowed to remain on smear for 30–60 seconds.
- Remove excess stain with water.
- Then add iodine solution for at least 60 seconds.
- Wash with water.
- Finally wash the slide with alcohol or acetone.
- Wash the smear with tap water and observed under microscope.

Observation

If the bacteria have taken up the stain and appear a deep violet or purple black, then they are called Gram-positive bacteria, e.g. staphylococci, streptococci, pneumococci, *E. coli. B. anthracis, Clostridium tetani.*

b. Gram-negative Staining

- Staining procedure is similar to above.
- If bacteria do not retain crystal violet stain, then it is counter-stained by safranin for 10 seconds.
- Washed with water and the smear is dried and observed under microscope.

Observation

If bacteria are stained with safranin and pink or red colour is produced. These are called Gram-negative bacteria, e.g. gonococci, meningococci, *E. coli, S. typhi, H. influenzae*.

5 Write a note on Ziehl-Neelsen's acid-fast staining method.

Acid-fast microorganisms are:

- *Mycobacterium tuberculosis*.
- *Mycobacterium leprae*.

Ziehl-Neelsen's Staining Procedure

Scientists Ziehl and Neelsen discovered this method. It is important for separation of "Mycobacteria group" members from others. Ziehl-Neelsen acid-fast staining method is most commonly used for a diagnostic aid in identification of species.

Procedure of Staining

- A smear is prepared from the given tubercle sputum and fixed on slide by heat.
- On the smear a Ziehl-Neelsen carbolfuchsin stain is added and allowed to react for 10 minutes.
- Precautions were taken to avoid the boiling of stain.
- Wash the smear with water.
- Add 20% H_2SO_4 for one minute and wash it with water.
- Add methylene blue or malachite green for 30 seconds.
- Wash the slide and dry and observe under oil immersion lens.

Observations

- Cells those appear pinkish red are acid-fast cells/bacteria.
- Cells those appear blue/green are nonacid-fast bacteria.

6 What do you mean by "isolation"? Describe various techniques of isolation of microorganisms.

☞ Isolation

Isolation is defined as separating completely and obtaining in pure form of particular type of microorganisms, separating it from its habitat.

Methods of Isolation

- Streak plate method.
- Pour plate method.
- Single cell isolation.
- Direct transfer technique.
- Serial dilution technique.

a. Streak plate method

- In this method small amount (a loop-full) of sample is transferred on a suitable sterile solid nutrient medium in Petri dish.
- The sample is streaked by a Nichrome wire loop in such a way that streaking provides successive dilution and thereby the isolated colonies.
- Streaking a solid culture medium in a Petri dish can be done by the following methods.

i. *Square method*: One loopful suspension is streaked on solid nutrient medium in horizontal line first. Then plate/dish is rotated anticlockwise in 90° and again streaks are made in vertical lines giving rise to square of streaking. The last square will give maximum dilution of sample and so the isolated colonies.

ii. *Four quadrant method*: A loopful of sample is placed at one spot ½ cm away from periphery of Petri dish, on solid culture medium. From this place linear streaks are made. Then from end of first streak second streaks are made by rotating plate anticlockwise. Likewise four streaks are made. Care is taken so that last streaks are made. Care is taken so that last streak do not touch the original spot. On last streak (i.e. on fourth quadrant) maximum. Dilution of sample is achieved and so on last steak isolated colonies are obtained.

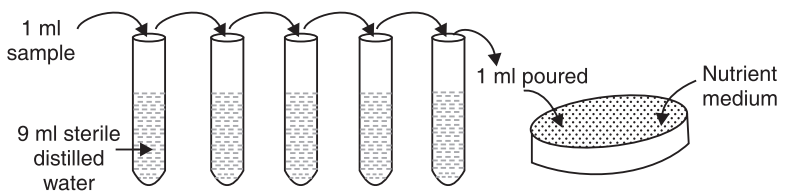
iii. *Zigzag method*: A loopful of sample is streaked on solid nutrient agar medium in zigzag manner. This also allows maximum dilution of terminal end of zigzag streak, where isolated colonies are obtained.

b. Pour plate method

To obtain pure culture by isolation via pour plate method, serial dilutions of the given sample are necessary.

For serial dilution, a set of tubes each containing 9 ml sterile distilled water is taken. Then 10 ml of original sample is added to first tube containing distilled water. From this tube 1 ml is added or transferred to second tube containing 9.0 ml distilled water and so on.

Finally 1 ml of any suitable dilution is mixed with sterilized, melted and cooled nutrient medium in sterile Petri dish. The contents are mixed thoroughly by gentle rotation of Petri dish. The contents are then allowed to cool and solidify. Such plates are then incubated for specific time period, to obtain isolated colonies.



c. Single cell isolation by micromanipulator

- In this method single cell of desired type can be picked out from the mixed culture. This can be done by micromanipulator in combination with microscope.
- Micromanipulator has a micropipette with a very fine capillary point. The micropipette can be moved as desired.
- A single cell can be moved as desired.
- A single cell can be picked by using micropipette and transferred to a suitable nutrient medium.

d. Direct transfer technique

Sometimes bacteria, yeast and moulds may be found in pure culture under natural conditions. Such cultures can be directly transferred to a suitable medium and incubated to get number of colonies.

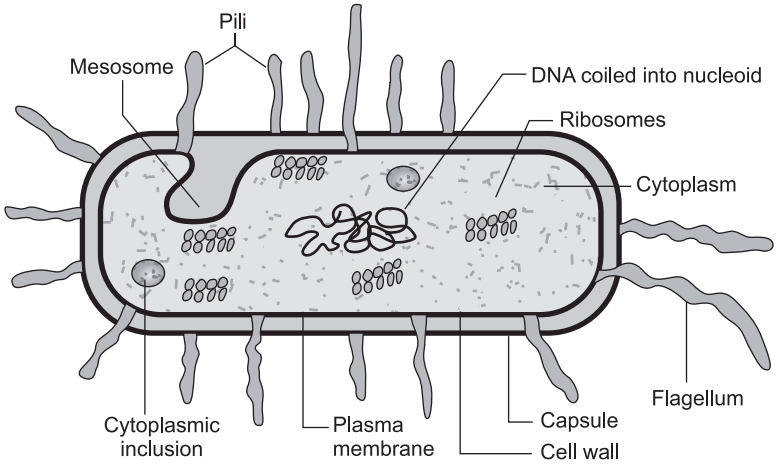
e. Serial dilution technique

In this techniques serial dilution of bacteria is done in a series of test tubes.

A small amount of the mixture of bacteria is added to a test tube containing sterile medium of known volume. One ml of liquid bacteria mixture is then diluted to the desired dilution by transfer through a series of test tubes containing similar volume of sterilized medium. A stage will be reached when higher dilutions will contain no organisms and will show no growth upon incubation.

Some of the tubes of higher dilution showing growth will be found to contain only one colony of a species which can be observed by microscopic examination.

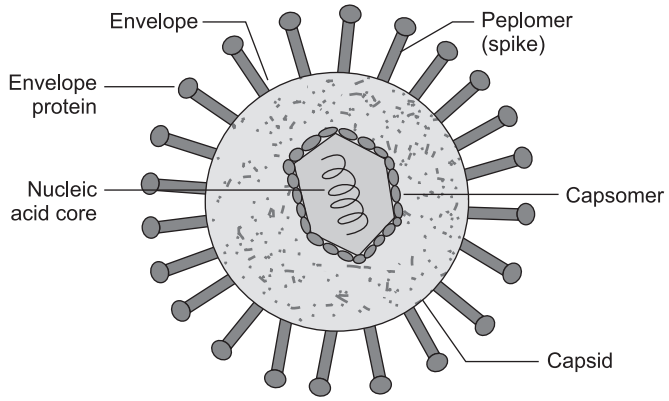
7 Describe the structure of bacterial cell along with diagram: (S. 22, W. 23)



Structure of bacterial cell:

- Capsule is an outer covering.
- Cell wall encloses cytoplasm, cytoplasmic membrane and inclusions such as ribosomes, mesosomes, DNA, etc.
- Fine hair-like structure pili are also present in some bacteria.
- Some bacteria also carry flagellum which help for swimming movements.
- Ribosomes present in cytoplasm help in protein synthesis.
- Plasma membrane which surrounds the cell works as a permeable barrier, transport of solutes, etc.

8 Describe the structure of virus along with diagram:



Structure of virus

- Virus is an ultramicroscopic entity on boundary of living and non-livings.
- It does not possess the cellular organisation.
- Structurally, it possesses protein coat called "Capsid" enclosing nucleic acid at central core.
- Capsid is made up of structural units called capsomers, where each capsomer is made up of 7 to 8 monomers.
- Virus carries centrally located nucleic acid, either DNA or RNA but never the both.
- Virus particles may be 'enveloped' or 'naked', i.e. without envelop. Envelop may show projections called peplomers (spikes)
- Virus may show cubicle or rod-like form of structure.
- Pathogenicity of virus is because of nucleic acid, while antigenicity is because of capsid and envelope.

9 Define microbiology. Give the classification of Bacteria depending upon shape: (W. 22)

Microbiology: It is the study of micro-organisms with respect to their cytology, physiology reproduction and useful activities or hams caused.

Classification of Bacteria

1. Cocci—bacteria spherical or round
2. Bacilli—rod shaped bacteria

3. Spirilla—rigid spiral or spring shaped bacteria
4. Vibrios—comma shaped bacteria
5. Spirochaetes—spirochetes
6. Actinomycetes—branching filamentous bacteria

10 Differentiate between prokaryotic cells and eukaryotic microorganisms. (W. 23)

Parameter	*Prokaryotic cells*	*Eukaryotic cells*
Membrane-bound organelles	Absent	Present
Cell size	Smaller	Larger
DNA form	Circular	Linear
Complexity	Sinipler	Complex
Mitochondria	Absent	Present
Ribosomes	70S	80S
Golgi apparatus	Absent	Present
Endoplasmic reticulum	Absent	Present
Cell division	Binary fission	Mitosis
Number of chromosomes	Only one	More than one
Examples	Archea and bacteria	Fungi, protists animals

B

Epidemiology

1 Define epidemiology. Give the major uses of epidemiology. (W. 22, 23, S. 24)

☞ Epidemiology

"Epidemiology is the study of distribution and determinants of health related events and diseases in the population and also the application of this knowledge to control health problems."

The term epidemiology is derived from Latin words:

Epi—among, Demons—people, Logos—study.

Uses of Epidemiology/Scope/Applications:

- It helps to study the disease distribution and its size in the human population.
- It helps for doing community diagnosis and to compare two or more than two geographical areas.
- It helps in planning, implementations and evaluation of health services.
- It helps in the prevention and control of public health problems on priority basis.
- It helps in estimating the needs of resources (money, material, man, etc.)
- It helps in identifying the causes of diseases.
- It helps in identifying clinical syndromes.
- It helps in estimating a person's risk of developing a disease and his chances for survival.
- To determine mode of transmission of disease.

2 Define the terms.

a. Incidence Rate

It is defined as number of new cases of a disease in a particular geographical area per one thousand population in a defined time period, e.g. if there are 200 new cases of disease in a population of 40,000 in one year, the incidence rate will be = 200/40,000 × 1000 × 1 = 5 per 1000.

b. Prevalence Rate

It is defined as occurrence of old and new cases of a disease in a particular geographical area per one thousand population in a defined time period, e.g. if 30 new cases of diseases and 40 cases were continuing from last year in the population of 14,000, then prevalence rate will be = (30 + 40)/14,000 × 1000 = 5 per 1000.

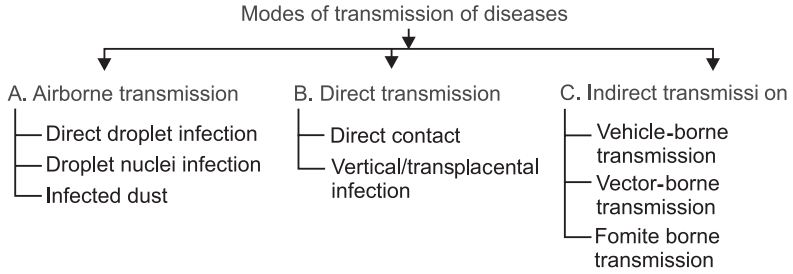
3 Define the terms.

- *Infection*: Infection is defined as the successful entry and development of infectious agent in the host body.
- *Incubation period*: The time interval between entry of disease producing agent into the host body and the appearance of symptoms of disease is called incubation period.
- *Contamination*: It is the presence of infectious agent on inanimate objects such as clothes, beds, toys, utensils, on food items and water.
- *Infestation*: It is defined as lodgement, development and reproduction of arthropod either on body or on the clothing, e.g. lice, mite.
- *Infectious disease*: Any disease resulting from infection is called infectious disease.
- *Contagious disease*: Any disease transmitted by direct or indirect contact is called contagious disease, e.g. scabies, aids.
- *Communicable diseases*: The diseases which are transmitted from man to man, animal to animal or man to animal are called communicable diseases, e.g. TB, leprosy.
- *Noncommunicable diseases*: The diseases which are not transmitted from man to man, or animal to animal but may be caused due to multiple reasons are called noncommunicable diseases, e.g. cancer, diabetes mellitus, night blindness.

- *Epidemic diseases*: The diseases which are rapidly spreading and attacking many people in a region in a very short period of time are called epidemic diseases, e.g. smallpox.
- *Endemic disease*: When an infectious disease is always found in certain geographical area, without importation from outside, is termed endemic disease.
- *Sporadic disease*: When a disease occurs at intervals and in single scattered or isolated cases, it is called sporadic disease.
- *Pandemic disease:* It is the disease presents almost in all countries in the world, e.g. AIDS, COVID-19.
- *Zoonotic diseases*: The diseases which are transmitted from vertebrate animal host to the man under natural conditions are called zoonotic diseases, e.g. rabies, plague, salmonellosis.
- *Surveillance*: It includes collection, analysis, interpretation and distribution of data related with a disease.
- *Eradication*: It is an absolute term which indicates removal of disease from the complete world.
- *Host*: A person or animal which allows lodgement of an infectious agent in its body.
- *Fomites*: Fomites are substances capable of absorbing, retaining or transferring infection, e.g. towels, clothes, pens, utensils.
- *Reservoir*: A reservoir is a person or animal or arthropod or plant or soil, water and food in which infectious agent is maintained.
- *Carriers*: Carriers are the persons who harbour pathogenic micro-organisms of a specific infectious disease without showing any signs and symptoms of the disease but are able to infect other individuals.
- *Source of infection*: The source of infection is defined as "the person, animal or object or substance from which an infectious agent passes to the host".
- *Vector*: A vector is an arthropod or a living animal that transfer the infectious agent to a susceptible individual, e.g. mosquito vector in malaria, filariasis, rat flea in plague.
- *Isolation*: Isolation means complete separation of infected person from contact of other human beings for the period of communicability.
- *Quarantine*: A quarantine is a restriction on the movement of people, animal and goods which is intended to prevent the spread of disease.

- *Contact tracing*: It means to find all contacts of a confirmed case of infectious diseases, in order to test or monitor them for infection.
- *Outbreak*: An outbreak is a sudden increase in occurrence of a disease when cases are in excess of normal expectancy for the location or season.
- *Medical entomology*: The branch of science that deals with insects that cause disease.

4 Describe the modes/routes/methods of transmission of communicable diseases/infectious diseases. Or Example various dynamics of disease transmission.



A. Airborne Transmission

In respiratory infections while patient coughs or sneezes, a shower of small droplets of saliva is generated and dispersed in the atmosphere and droplets contain thousands of microorganisms and if they are inhaled by a healthy person he gets infected. Droplet infection is possible in three ways:

i. *Direct droplet infection*: In this case, the large droplets may infect the healthy person as they are inhaled directly from the air and because they do not travel long. The mode of transmission requires close contact. Sometimes these droplets fall down on objects like beds, clothing, or dust and may contaminate these articles which may infect the healthy host.

ii. *Droplet nucleic infection*: When the droplets are tiny, the moisture content evaporates rapidly and leave behind a minute residue or nucleus which becomes light and remain suspended in the air, which is termed droplet nuclei.

A droplet nuclei may contain one or many organisms. This nucleus remains in the atmosphere and may be transferred to other place by

wind and whenever it is inhaled by a healthy host it may infect the host. Droplet nuclei may survive in atmosphere for a considerable period of time.

iii. *Infected dust*: In this case droplets settle down on articles or fall down on the dust. This infected dust is elevated in the air while dry sweeping bed making and may inhaled by the host and can get infected.

B. Direct Transmission

When no external agency is required for the transmission of infection is called direct transmission.

i. *Direct contact*: Infection is transmitted by direct contact of skin of two persons. The contact may be by touching or by sexual intercourse or living very close to an infected person, e.g. eye infections, leprosy, AIDS.

ii. *Vertical or transplacental infections*: When the disease agent is transmitted from infected mother to the foetus, it is called vertical or transplacental transmission, e.g. AIDS, Hepatitis-B, rubella virus.

C. Indirect Transmission

If transmission of disease agent requires some substance like milk, water insect or some belonging of the patient it is called indirect transmission. The inanimate substances during the process of transmission are called "vehicle" and the insect is called "vector" of the disease:

i. *Vehicle-borne transmission:* The commonest vehicle for dis-ease transmission is water and such diseases, are called "water-borne diseases", e.g. cholera, typhoid, diarrhoea, dysentery.

Other important vehicles are milk, raw fruits, vegetables, blood products, tissues, organs, e.g. milkborne diseases, diphtheria, sore throat, enteric fever.

ii. *Vector-borne transmission*: A vector is an arthropod or a living animal that transfers the infectious agent to a susceptible host.

Vector-borne transmission is very simple as flies transmit the disease agents from one place to another on their bodies, wings or legs, e.g. mosquito vector takes part in the life cycle of the disease agent, for example, in malaria, filariasis, rat flea is a vector of plague.

iii. *Fomite borne transmission*: Fomites are the belongings of the patient which come in direct contact with the patient and get contaminated. Fomites includes clothes, towels, utensils, pens, instruments and removed dressing. These fomites can preserve the disease agent. For sometimes and whenever a healthy person uses these articles, the disease agent is transmitted to him.

5 Define host. What are the types of host?

☞ Host

"Host is a person or animal which allows lodgement of an infectious agent in his body."

Types of host

- *Obligate host*: It means as man in measles or typhoid where no animal host exists.
- *Intermediate host*: The host in which asexual part of life cycle of the parasite takes place.
- *Definite host*: The host in which sexual part of life cycle of the parasite takes place.
- *Susceptible host*: It means man which easily allows the microorganisms to establish either on the tissues or within the body to cause infection.

6 What is reservoir? Explain types of reservoir of infection.

☞ Reservoir

"A reservoir is a person or animal or arthropod or plant or soil, water and food in which infectious agent is maintained."

Types of Reservoir

- *Human reservoir*: It can be a case suffering from the particular disease but can infect others. They can be identified by laboratory examinations.

  In some diseases the infective agent remains in the body without the disease because of various reasons as improper treatment, low resistance, immune disorders.
- *Animal reservoir*: The diseases which primarily affect animals but can also infect human beings are called zoonotic disease, e.g. rabies (hydrophobia), influenza, yellow fever. The occurrence of this disease depends upon the migration of animals from one place to another.

- *Nonliving reservoir*: This can be soil, water, food, fruits and vegetables, milk products, contaminated objects like furnitures, stationary, clothing, linen, utensils, formites, etc. and laboratory materials including surgical instruments. The disease agent can be virus, bacteria, rickettsiae.

7 Define carriers. What are the types of disease carriers?

☞ Carriers

Carrier is defined as the person or any animal carrying the disease agent but not showing any sign and symptom of disease but are able to infect other individuals.

Types of Disease Carriers

- *Incubation carriers*: These are the persons during incubation period of the infectious disease.
- Contact carriers: These are persons who are in contact with a case of an infectious disease and carry microbes morphologically identical with those causative of the diseases.
- *Convalescent carriers*: These are persons who continue to harbour during convalescence. They are sometimes called acute carriers.
- *Chronic carriers*: These are persons who harbour infective organisms for a long period (e.g. 3 months) after recovery from the disease. Such carriers are more dangerous.

8 What are "hospital acquired infections"? How are they prevented?/Nosocomial infections.

☞ Nosocomial Infections

"It is an infection appearing in a patient when he or she visited the hospital or other health care facility."

It is not related with disease for which patient was admitted. In other words, if the patient had not visited the hospital, the patient would have not acquired the infection. The symptoms may appear after his discharge from the hospital. It is reported that about 5% of patients admitted to the hospitals are likely to get such infections.

Sources/Causes of Nosocomial Infection

- Staff attending the patient such as sweepers, nurses, doctors suffering from infection.
- Cross infection from other person in hospital who are already infected.

- Persons visiting the hospitals to see the patients.
- Due to objects like surgical instruments, dressing, etc.
- Due to infected syringe and needles.

Examples of Hospital-acquired Infections

- Hepatitis B
- HIV infection
- UT infections
- Wound infections
- Tuberculosis
- Pneumonia.

Prevention and Control of "Hospital-acquired Infections"

- Patients with infections should be isolated.
- Disinfecting the air in hospital.
- Avoid spitting and smoking in hospital.
- The surrounding environment of the patient should be kept completely from dust which may spread infection.
- Articles used by patients should be disinfected.
- Aseptic measures should be followed in wards, operation theatres, labour rooms.
- All the cases of wound infection should be notified.
- There should be adequate space between beds.
- Cleaning and sterilization of urine pots, kidney-trays, bed-pans should be done regularly.
- UV lamps should be provided.
- All the staff attending patients, should have periodical medical check to detect and treat infection.
- Every hospital should have an infection control committee which should monitor and control infections in a hospital.

9 What do you mean by notifiable diseases? Give examples.

☞ Notifiable Diseases

The diseases which should be immediately intimated to the local health authorities to take preventive measures and to provide medical care to the patients, are called notifiable diseases.

Examples

- Cholera
- Smallpox
- Plague
- Leprosy
- Tuberculosis
- Whooping cough
- Measles
- Typhoid, etc.

10 What do you mean by notification of diseases? Give its advantages/uses/importance/significance.

☞ Notification

Notification is a procedure required to report the occurrence of every notifiable disease to the health authority at the earliest.

- Notification is one of the preventive measures taken up to control spread of disease.
- Notification indicates immediate intimation of every case of an infectious disease to the available healthy authority such as municipal medical officer of health, district medical officer of health.

Advantages/Importance of Notification

- It allows the authorities to isolate the patient, to treat patient and to follow necessary disinfection.
- It helps to prevent the spread of infection by promptly taking measures and thus safeguard the rest of the community by vaccination.
- The real and original source of infection can be found out and corrected.
- It helps to control spread of infection through schools or other centre by excluding members of infected household.
- It provides an opportunity of investigation of the sanitary condition of all households, where diseases are reported.
- It provides opportunity of investigation the source of an epidemic by examining milk supplies, water supplies, etc.

11 What is the isolation of patient? How isolation of patient is done in hospital and private houses?

☞ Isolation of Patient

"It means complete separation of infected person from contact of other human beings for the period of communicability."

- Isolation can be done either in hospitals or at homes.
- The period of isolation depends upon the degree of spreading ability of infected person.
- The purpose of isolation is to protect the community from infectious disease.

A. ***Isolation Hospital***

1. The site of hospital should be dry, healthy, and well-drained.
2. It should be away from congested area.
3. It should have convenient approach.
4. Separate wards should be provided for different infectious diseases.
5. Each patient should have 144 square feet floor space and 6000 cubic feet of fresh air per hour.
6. There should be proper arrangement for the supply of pure water, removal of excreta and urine.
7. Soiled clothes should properly disinfected.

B. ***House Isolation/Home Isolation***

- The sick room should be separated and should be located at upper floor.
- All necessary furniture should be removed.
- A sheet soaked in a disinfectant should be hung in front of the door as a curtain.
- The windows should be kept open to ensure adequate ventilation.
- Only attendants or nurses should be allowed to go in the sick room. They must wash their hands in some disinfectant solution before leaving the sick room.
- The soiled clothes of the patient should be immersed in disinfectant solution and then boiled.
- Excreta and remainder of food should be received in a vessel containing a strong disinfectant solution and should be buried in the ground or burnt away.

- Anti-fly and anti-mosquito measures must be taken to exclude flies and mosquitoes from the sickroom.
- The utensils must be disinfected properly after taking them out of the sick room.
- Visitors should not be allowed to enter the sickroom.
- Children and workers from the infected house should not be allowed to go to their respective institutions.
- After being out of danger of infection, the patient should be well washed and bathed thoroughly and given a complete charge of clothes before mixing with other persons.
- In case of death, the dead body should be recovered in a sheet soaked in carbolic solution and burned as soon as possible.
- The sick room should be thoroughly disinfected after having been vacated by the patient.

12 Define the terms.

- *Antiseptic*: Any substance which destroys or inhibits the growth of microbes which applied to living tissue is called antiseptic.
- *Disinfectant*: Any substance which destroys or microbes but not usually spores when applied to nonliving objects.
- *Sterilisation*: It is the process of complete destruction of micro-organisms from the system.
- *Disinfection*: It is the process of destruction of disease causing agent from the inanimate objects.

13 Define the term epidemiology. Enlist and explain different types/methods of epidemiology. (S. 23, 24)

Epidemiology

Epidemiology is the study of the distribution and determinants of health-related events and diseases in the population and the application of knowledge to control health problems.

Epidemiological Methods/Types

1. Descriptive epidemiology:

It is concerned with the distribution of disease or health related characteristics in human population and identifying the characteristics with which the disease in question appears to be associated, i.e. time of the disease occurrence, place where the disease is occurring and who is affected by the disease.

2. The analytical epidemiology

It consists of two observational studies:

i. Case control study:
- Retrospective study
- From effect to the cause
- Studying the disease and see if you can associate risk factors to it

ii. Cohort study:
- Prospective study
- From cause to the effect
- Studying the risk factor to see if disease is associated with it.

3. Experimental epidemiology

The aims of experimental studies are as follows:
- To provide scientific proof of etiological or risk factors which may permit the modification or control of those diseases.
- To provide a method of measuring the effectiveness and efficiency of health services for the prevention, control and treatment of disease and improve the health of the community.
- The experimental studies can be conducted in animals or human beings.

14 Give the difference between active immunity and passive immunity.

Active immunity	*Passive immunity*
i. Antigens are injected in the human body, as a result, antibodies are formed.	i. Ready-made antibodies are injected in the human body.
ii. It develops slowly.	ii. It develops quickly.
iii. It remains for longer time.	iii. It remains for short period.
iv. The treatment is preventive.	iv. The treatment is therapeutic.
v. Immunological memory is present.	v. Immunological memory is absent.
vi. Not useful in immunodeficient hosts.	vi. Useful in immunodeficient host.
vii. No inheritance	vii. May be acquired from mother.
viii. Preparation: Vaccine, toxoids.	viii. Preparations: Sera

15 State the National Immunisation Schedule. (W. 22)

Beneficiaries	*Age group*	*Name of vaccines*	*No. of doses*	*Routes of administration*	*Remarks*
Infants	6 weeks to 9 months 9–12 months	DPT Oral polio vaccine (OPV) BCG Measles	3 3 1 1	Intramuscular Oral Intradermal Subcutaneous	3 doses at an interval of one month. Is institutional Delivery BCG can be given at birth
Children	16–24 months 5–6 years	DPT (1 Booster) OPV (1 Booster) DT (II Booster) Typhoid	1 1 1 2	Intramuscular Oral Intramuscular Subcutaneous	 2 doses if not immunized previously At an interval of one month.
10 years		Tetanus toxoid (TT)	1	Intramuscular	2 doses if not immunized previously.

16 years		Tetanus toxoid (TT) Typhoid	1 1	Intramuscular Subcutaneous	2 doses if not immunized previously 2 doses if not immunized previously.
Pregnant women	16–36 weeks	Tetanus toxoid	2	Intramuscular	Only one dose needed if immunized previously within last three years.

C

Communicable Diseases

1 Define "Communicable Diseases". Give the classification of communicable diseases prevailing in India. (W. 22)

☞ **Communicable Diseases:**

The diseases which are transmitted from man to man, or animal to animal or man to animal are called communicable diseases, e.g. tuberculosis, leprosy, COVID-19, AIDS, etc.

☞ **Classification/categories of communicable diseases: Disease prevailing in India**

(a) **Respiratory infections,** e.g. chickenpox, measles, rubella, mumps, influenza (including, Avian-Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningits, acute respiratory infections, tuberculosis, Ebola.

(b) **Intestinal infections,** e.g. poliomyelitis, viral hepatitis, cholera, acute diarrhoeal diseases, typhoid, amoebiasis, warm infestations, food poisoning.

(c) **Arthropod-borne infections,** e.g. dengue, malaria, filariasis, chikungunya, plague.

(d) **Surface infections,** e.g. trachoma, tetanus, rabies, leprosy.

(e) **Sexually transmitted diseases,** e.g. AIDS, syphillis, gonorrhoea.

2 Give the causative agent, epidemiology (mode of spread), clinical presentations and role of pharmacists in prevention of the following communicable diseases.

☞ **1. Chikenpox (Varicella)**

Chickenpox is also known as varicella is an acute infectious disease. It is a viral infection. Chickenpox occurs mainly in children below 10 years of age.

- **Causative agent:** Chickenpox is an acute highly contagious disease caused by a virus called varicella-zoster (V-Z virus)
- **Signs and symptoms (clinical features):**
  - Onset of fever, chills, headache, severe backache.
  - Itchy skin (skin rash).
  - Lesions filled with pus.
  - Tiredness.
  - Dehydration.
  - Muscle aches.
  - Mouth soreness.
  - Loss of appetite.
  - Painful and reddish blisters.
  - Sore throat.
- **Incubation period:** Incubation period of this disease is about 14 to 16 days.
- **Mode of transmission:**
  (i) Chickenpox is transmitted from person to person by droplet infection or by contact with skin.
  (ii) Freshly contaminated articles used by the patient can also transmit the disease.
  (iii) Sometimes the disease spreads by contamination from the discharge from ruptured lesions of the skin.
- **Pathogenesis:**
  - The virus enters the body through upper respiratory tract.
  - It first infects the mucosal cells and immediately reaches the regional lymph nodes.
- **Prevention and control:**
  (i) Isolation of the patient.
  (ii) Disinfect all the articles used by the patient.
  (iii) Passive immunization by varicella-zoster immunoglobulin given within 72 hours of exposure in the dose of 1.25 to 5 ml by IM injection.
  (iv) There is no specific treatment for chickenpox.
- **Role of pharmacist in prevention:**
  - Education to the people to take the vaccine.
  - Creating awareness in people to prevent the spread of chickenpox by practising good hygiene and washing of hands frequently.
  - Reduce the exposure of infected patient in the community.

- Instruct the patient to stay home until all blisters have dried and crusted over.

2. Measles (Rubella)

Measles is one of the commonest infectious diseases of children up to 6 years of age.

- **Causative agent:** It is a highly infectious disease caused by RNA paroxysmal virus is called rubella virus.
- **Incubation period:** Incubation period is commonly 10 days from exposure to onset of fever and 14 days to appearance of rash.
- **Signs and symptoms (Clinical features):**
  - High fever
  - Cough
  - Runny nose
  - Red, watery eyes (conjunctivities)
  - Sneezing
  - Hoarseness of voice.
  - Tiny white spots (Koplik spots) may appear inside the mouth.
- **Modes of transmission:**
  (i) Its spread is direct from person to person through droplet infection, i.e. sneezing, talking, kissing.
  (ii) Direct contact with fomite such as spoons, cups and other articles used by patients.
  (iii) The portal of entry is the respiratory tract or rarely conjunctiva.
- **Prevention of measles:**
  (i) Immunization by measles vaccines.
  (ii) Administration of human measles immunoglobulin.
  (iii) Ongoing immunization against the disease through successive generations of children.
- **Control of measles:**
  (i) Isolate the patient as soon as the signs and symptoms of measles appear.
  (ii) Protect the eyes of the patient from light and glare.
  (iii) Disinfect the discharges of nose and throat of the patient.
  (iv) Antibiotics may be given to the patient to prevent secondary infection.
  (v) Immunize the susceptible children.

- **Role of pharmacist in prevention of measles:**
  (i) Guide the people for active immunizaiton.
  (ii) To create awareness about isolation of the patient immediately.
  (iii) Guide the patient for disinfection of discharges of nose and throat infection.
  (iv) Guide the people regarding immunisation of the susceptible children.
  (v) Passive immunization is indicated for prophylaxis of measles.

3. Mumps

Mumps is a viral infection that affects the salivary glands and is easily preventable by vaccine.

- **Causative agent:** Mumps is caused by an organism called a paramyxovirus.
- **Incubation period:** The incubation period varies from 2 to 3 weeks, usually 18 days.
- **Signs and symptoms (clinical features):**
  - Pains and swelling of both parotid glands.
  - Fever, headache.
  - Fatigue, loss of appetite.
  - Pain and stiffness on opening the mouth.
  - Mumps may also affect testes, pancrease, ovaries, prostate and CNS.
  - Few rare complications are diabetes, nerve deafness, polyarthritis, pancreatitis, ovaritis.
- **Mode of transmission of mumps:**
  (i) It can be transmitted by airborne respiratory droplets, e.g. coughing, sneezing.
  (ii) By touching a contaminated surfaces, e.g. blanket, tables, etc.
  (iii) By saliva (kissing or shared drinks).
- **Prevention and control measures of mumps:**
  (i) Immunisation is the only effective way of prevention.
  (ii) Mumps vaccine is given in the form of trivalent form (measles, mumps-rubella: MMR)
  (iii) Washing of hands with water and soap frequently.
  (iv) Not going to work/school until 5 days after the symptoms starts.
  (v) Covering the nose and mouth with the tissue or handkerchief while sneezing or coughing.

- **Role of pharmacist in prevention of mumps:**
  (i) Pharmacist should guide the families for vaccination of mumps.
  (ii) Pharmacist can create awareness regarding personal hygiene, washing of hands frequently, covering nose and mouth during sneezing and coughing.
  (iii) Pharmacist can tell regarding isolation of patient to prevent spreadability of the disease in the community.
  (iv) Pharmacist should guide for the proper disinfection of the articles used by the patient.

4. Avian Flu (H5N1, H7N9) (Avian influenza)

- It is normally known as "avian flu or bird flu".
- Influenza caused by viruses adopted by birds.
- The version with the greatest concern is highly pathogenic avian influenza (HPAI). It exists as two types of variants: H5N1 and H7N9.
- Strains of the influenza virus that primarily infect birds, but can also infect humans.
- **Causative agent:** The causative agent of avian flu is influenza A virus.
- **Signs and symptoms (Clinical features):**
  - Common flu
  - Cough fever
  - Sore throat
  - Muscle aches, headache
  - Shortness of breath
- **Mode of transmission of avian flu (bird flu)**
  - The disease is transmitted via contact with infected birds faeces or secretions from its nose, mouth or eyes.
  - Open air market, where eggs and birds are sold in crowded and unsanitary conditions are the hot spots of infection and can spread the disease into the wider community.
  - Human infections with bird flu viruses can happen when enough virus gets into a persons' eyes, nose or mouth or is inhaled.
  - Most cases of H5N1 infection in humans are the result of direct contact with poultry or with objects or surfaces contaminated with faeces from infected poultry.

- Since the first H5N1 outbreak occurred in 1987, there has been an increasing number of avian flu bird to human transmissions, leading to clinically severe and fatal human infections.

- **Preventio n and control measures of avian flu:**
  1. People should avoid wild birds and observe them only from a distance.
  2. Avoid contact with domestic birds (poultry) that appear ill or have died.
  3. Avoid contact with surfaces that appear to be contaminated with faeces from wild and domestic birds.
  4. Avoid visiting poultry farms, birds markets and other places where live poultry are raised, kept, or sold.
  5. Avoid preparing or eating raw or undercooked poultry products.
  6. Practice hygiene and cleanliness.
  7. Visit a doctor when any one is sick during or after travel.
- **Vaccination:**
  - A H5N1 vaccine is an influenza vaccine intended to provide immunization to influenza A virus subtype H5N1.
  - Vaccines have been formulated against several varieties of avian H5N1 influenza.
  - Vaccination of poultry against H5N1, epizootic is recommended.
- **Role of pharmacist in prevention of avian flu:**
  - Pharmacist should create awareness in the peoples regarding mode of spread of avian flu.
  - Pharmacist should tell the people to take utmost care to avoid the contacts of surfaces where the birds are living.
  - Pharmacist should tell the people to protect eyes, nose, mouth and hands from the possibilities of infection of virus.
  - Pharmacist always informs the people about sanitation of hands frequently to reduce the chances of contamination.
  - Unprotected clothings or footwear should be disinfected.
  - Avoid the people to contact with poultry and maintain personal hygiene.

- Someone who has normal flu should be more careful in avoiding contact with birds.

5. Influenza (Flu) (H1N1) (S. 24)

- Influenza is an acute respiratory tract infection caused by influenza virus. It is know as 'flu'.
- Influenza tends to spread rapidly.
- It is a worldwide infection and causes local or widespread epidemics and pandemics.
- It affects people of all ages and both sexes and affects millions of persons every year.

☞ **Causative Agent:** It is an acute infection of respiratory tract caused by influenza viruses A, B, C.

All known pandemics were caused by strain A. The disease is characterized by sudden onset of chills, fever, muscular pain and cough.

☞ **Incubation Period:** It is short and varies from 1–2 days. Immunity is very short which ranges from 6–8 months.

☞ **Signs and Symptoms (Clinical Features):**

(i) Sudden onset of chills, fever.
(ii) Muscular pains.
(iii) Cough.
(iv) Headache, weakness, muscle ache.
(v) A sore throat, runny nose.
(vi) Inflammation of respiratory and GIT with vomiting.

☞ **Mode of Transmission of Influenza:**

- The influenza virus is present in the nasal secretions and the sputum of the patient.
- The infection is transmitted from one person to another by:
  (i) Direct contact of person
  (ii) Droplet infection.
  (iii) Through formites recently contaminated with the virus.

☞ **Clinical Presentations:**

- Virus enters the respiratory tract and causes inflammation and necrosis of superficial epithelium of the tracheal and bronchial mucosa followed by secondary bacterial invasion.
- The symptoms include fever, chills, aches, pains, coughing and generalized weakness.
- Fever lasts for 1–5 days, averaging 3 days in adults.
- The most common complication is pneumonia which should be suspected if fever persists beyond 4–5 days.

☞ **Prevention and Control Measures of Influenza:**

- Use of influenza vaccines.
- Early detection and notification to the health authorities.
- Isolation of suspected cases.
- During illness avoid meeting people for one week.
- Avoid going to overcrowded places.
- Body should be protected from chills by wearing sufficient warm clothes.
- Face mask should be used while attending a patient.
- The clothing, beddings, fomites and room used by the patient should be thoroughly disinfected.
- Sneezing, spitting and coughing in public places should be avoided.
- Saline gargle should be regularly done.
- Perform regular light exercise, keep fit, take nourishing food, avoid fatigue and chills, and keep in a well-ventilated room.

☞ **Role of Pharmacist in Prevention of Influenza:**

The pharmacists can guide to the peoples in the following ways to prevent the influenza infection

- Good ventilation in public buildings.
- Avoiding crowded places during epidemic.
- Encouraging patients to cover their faces with handkerchief or paper while coughing and sneezing.
- Staying at home should be advised to the patient at the first sign of influenza.
- Proper disinfection of the articles used by the patient of influenza.
- Personal hygiene and washing of hands with sanitizers frequently should be advised to the patient.

6. SARS

- Severe acute respiratory syndrome (SARS) was first identified in 2003.
- SARS is an airborne virus and spreads in a similar way to cold and flu.

☞ **Causative Agent:** It is a viral disease. SARS was the result of infection by a coronavirus and the scientist named SARS associated coronavirus (SARS CoV). SARS-CoV is related to SARS CoV-2, the virus that causes COVID-19 infection.

The respiratory illness is known as SARS, which was first appeared in China in November 2002 and scientist identified it in February 2003.

☞ **Incubation Period:** Incubation period of SARS ranges between 3 and 10 days.

☞ **Signs and Symptoms of SARS (Clinical Features):**

1. Fever, chills
2. Muscle aches
3. Dry cough
4. Shortness of breath
5. Diarrhoea
6. Shivering (rigors)
7. Low oxygen levels in the body causing hypoxia.

☞ **Mode of Transmission of SARS:**

- It spreads through the direct close human contact.
- By droplets from coughing and sneezing.
- The body is likely absorbs the respiratory droplets through the mucous membranes of mouth, nose and eyes.
- Hugging and kissing spread the infection.
- Sharing utensils, for eating and drinking.
- Sharing clothes, beddings, fomites, etc.
- In 2015, scientist found evidence that SARS-CoV might survive on a dry surface for long periods possibly for several months.
- SARS was zoonotic disease meaning it was of animal origin but passed on to humans.

☞ Clinical Presentations:

- Early manitestations include influenza like symptoms such as fever myalgias and headache, diarrhoea and shivering.
- Fever is high and sometimes associated with chills and rigors.
- Fever may occasionally be absent in elderly persons.
- Diarrhoea has been reported in up to 25% of patients.
- The respiratory phase starts within 2–4 days of the onset of fever with a dry non-productive cough.
- This may progress to shortness of breath, usually in second week of the illness and may lead to hypoxemia.
- In 10 to 20% of the patients, the respiratory illness is severe and requires tracheal intubation and mechanical ventilations.

☞ Prevention and Control Measures of SARS:

1. Prompt identification of persons with SARS, their movements and contacts.
2. Effective isolation of SARS patients in hospitals.
3. Appropriate protection of medical staff treating these patients.
4. Strict identification and isolation of suspected SARS cases.
5. Simple hygienic measures such as hand washing after touching patients, use of well-fitted masks and introduction of infection control measures.
6. Exit screening of international travellers.
7. Timely and accurate reporting and sharing of information with other authorities and governments.

☞ Role of Pharmacist in Prevention of SARS:

Pharmacist can create awareness in the people for prevention of SARS disease in the following ways:

- Hand washing with soap and water or use of alcohol-based sanitizer.
- Disinfection of surface of fomites to remove viruses.
- Avoid contact with body fluids.
- Washing and disinfection of utensils, dishes, etc. used by SARS patient.
- Children with symptoms should not be send to school.
- Employees of various organizations take leaves during symptomatic duration.

- Use simple hygienic measures.
- Isolation of the patients at the earliest to minimize the chances of transmission of the virus.
- The pharmacist should make the medicines available for the treatment of SARS, e.g. ribavirin, lopinavir, ritonavir, etc.

7. MERS

Middle East respiratory syndrome (MERS) was first identified in Saudi Arabia in 2012.

☞ Causative Agent:

- It is caused by a Coronavirus called MERS-CoV.
- MERS is a viral disease.
- MERS is a zoonotic virus transmitted between animals and people.
- Humans are infected through direct or indirect contact with infected dromedary camels.
- It was identified in Middle East, Africa and South Asia.

☞ Incubation Period:

It is about 5 days, but may range from 2 to 14 days.

☞ Signs and Symptoms of MERS (Clinical Features):

- Fever, chills, rigors
- Headache
- Non-productive cough
- Dyspnoea
- Myalgia
- Vomiting, dizziness
- Sputum production
- Diarrhoea
- Abdominal pains
- Cough and shortness of breath
- Pneumonia has been reported
- Severe illness can cause respiratory failure which requires mechanical ventilation and ICU admission.

☞ Modes of Transmission of MERs:

1. By direct contact with infected person.
2. By droplet infection.
3. Contact with infected family members.
4. Spread through healthcare workers and patients.
5. Through contaminated objects.
6. It may be trasmitted from camels to humans.
7. The people who handle camels are at higher risk of MERS-CoV infection than people who do not have regular close contact with camels.
8. MERS-CoV infection should be suspected in travellers from the Arabian and neighbouring countries with symptoms compatible with MERS-CoV occurring within 10 days of travelling.

☞ Role of Pharmacists in Prevention of MERS

Pharmacist should help in implementing following preventive measures in the community:

(i) Wear a medical mask
(ii) Wear eye protection goggles or face shield.
(iii) Wear a clean, long-sleeved gown and gloves.
(iv) Perform hand hygiene before and after contact with patient as well as after removing PPE kit.
(v) Perform the procedures in well-ventilated room.
(vi) Minimum persons should be allowed to enter in the patient's room.
(vii) Pharmacist should make the drug available for the treatment of MERS, e.g. vancomycin, daptomycin, etc.

8. COVID-19 (S. 23, 24, W. 22, 23)

Coronavirus disease 2019 (COVID-19) was first identified in Wuhan district of China in December, 2019.

- COVID-19 belongs to the Coronavirus family which also includes the SARS virus and MERS virus.
- Coronavirus includes virus strain that cause the common cold and flu.

☞ **Causative Agent:**

COVID-19 is a viral disease caused by a virus from Coronavirus family. Genomically, COVID-19 virus is related to viruses causing SARS and MERS. From December 2019, it has become a pandemic influencing the entire world population.

☞ **Incubation Period:** 2 to 14 days after exposure to the virus.

☞ **Signs and Symptoms of COVID-19 (Clinical Features):**

- Fever, chills
- Cough
- Fatigue
- Shortness of breath
- Vomiting
- Loss of taste and smell
- It can affect upper or lower respiratory tracts
- Body aches
- Headaches
- Sore throat
- Diarrhoea
- The virus can lead to pneumonia, respiratory failure, heart failure, liver problems, septic shock and death.

☞ **Prevention and Control Measures of COVID-19:**

1. Isolation of patient in well-ventilated room.
2. Use triple layer medical masks, discard mask after 8 hr of use or earlier.
3. Mask should be discarded only after disinfecting it with 1% sodium hypochlorite.
4. Sufficient rest and drink a lot of fluids to maintain adequate hydration.
5. Follow respiratory etiquettes at all times.
6. Frequent washing of hands with soap and water or clean with alcohol base sanitizer.
7. Do not share personal items with other people.
8. Ensure cleaning of surfaces in the room with 1% hypochlorite solution.
9. Monitor temperature daily.
10. Monitor oxygen saturation with pulse oximeter daily.
11. Quarantine rules must be followed wherever necessary.

12. Do not allow COVID-19 affected person (symptomatic or asymptomatic) in community.
13. If spreadability rate is uncontrolled, then measure like "Lock-down" is preferred on priority basis.
14. To make availability of oxygen ventilators.

☞ Role of Pharmacist in Prevention of COVID-19:

- The major role of pharmacist is to make the effective drug available to the patient at the earliest in affordable cost.
- Pharmacist should help the COVID-19 patient in all respect that up to availability of oxygen beds, as a social responsibility.
- Pharmacist should help in prevention of COVID-19 by implementing following measures to the peoples:
  1. Avoid close contact with people who are sick.
  2. Norms of social distancing must be followed whenever needed in public places.
  3. Avoid touching your eyes, nose and mouth at least for 20 seconds.
  4. Frequent washing of hand with soap and water or alcohol-based sanitizer.
  5. Use the mask to avoid contamination by the virus.
  6. Educate the people about isolation, quarantine, etc.
  7. To inform the people about availability of drugs which are useful for the treatment of COVID-19, e.g. Remdesivir, favipiravir, sotrovimab, casirivimab, imdevimab, tocilizumab.

9. Diphtheria

- Diphtheria is an acute infectious disease affecting most commonly throat, tonsils, larynx or nose where it produces a greyish white false membrane of a soluble exotoxin.
- Diphtheria is widely distributed disease and affects persons of all ages but children in the ages of 3–5 years are more affected.

☞ Causative Agent:

Diphtheria is an acute infectious disease caused by the exotoxin of *Corynebacterium diphtheria.* It is a Gram-positive rod-shaped bacteria which grows mainly in throat, larynx and other portions of upper respiratory tract. It is found in the secretions of mouth, nose and throat.

☞ Incubation Period:

Incubation period varies from 2 to 5 days but occasionally it may be longer.

☞ Signs and Symptoms of Diphtheria (Clinical Features):

- Fever and toxemia
- Sore throat
- Difficulty in swallowing
- Low grade fever
- Infected membrane may be whitish and may wipe off easily
- Patches of greyish yellow membrane appear over tonsils and throat
- Swabs from this membrane show the presence of organism
- Difficulty in breathing
- Foul-smelling

☞ Modes of Transmission of Diphtheria:

1. Spreading droplet infection through coughing and sneezing.
2. By direct contact with infected person.
3. Indirect transmission through fomites or contaminated articles such as spoons, cups, toys, utensils, etc.
4. Contact with any lesions on the skin.
5. Infected individual touches with the surface or objects, where bacteria can left behind.

☞ Prevention and Control Measures of Diphtheria:

1. Early detection and notification to health authorities.
2. Isolation of the patients.
3. Immunization by diphtheria anti-toxin.
4. All infants should be immunized with DPT (triple vaccine), i.e. diphtheria pertussis and tetanus vaccine.

☞ Role of Pharmacist in Prevention of Diphtheria:

The pharmacist plays an active role in the prevention of diphtheria by implementing the following advices to the people/patients.

- Advise for active immunization with diphtheria toxoid.
- Pharmacist should know the schedule of vaccination after the birth and should be aware of contraindications. This information should be communicated to the people.
- Pharmacist should advise the infected patients to cover the mouth by handkerchief or mask to prevent spread of infection.
- Always disinfect the surfaces, utensils infected with the virus.
- Do not allow the infected patients in the crowded area.

- It is the responsibility of pharmacist to make the drugs available for the prevention and treatment of diphtheria as per the physicians, instructions.

10. Whooping Cough (Pertussis) (W. 22)

- Whooping cough is a highly infectious disease of the respiratory tract in which trachea, bronchi and bronchioles are involved.
- It occurs in all ages but more common in children under 5 years of age.
- It is characterized by mild fever and irritating cough, gradually becoming periodical with characteristic "whoop" meaning loud crowing inspiration. The disease is also known as "pertussis".

☞ Causative Agent:

Whooping cough is an infectious disease of respiratory tract caused by *Bordetella pertussis*.

☞ Incubation Period:

Incubation period is 7–14 days but not more than 3 weeks.

☞ Signs and Symptoms of Whooping Cough (Pertussis)

Clinical features:

- Mild fever
- Irritating cough
- Apnea
- Runny nose
- Nasal discharge
- Sore watery eyes
- Low grade fever
- Vomiting during or after cough
- Exhaustion (tiredness)
- Sneezing
- Lips, tongue and nail beds may turn blue during coughing spells.
- During coughing face becomes red, tears from eyes.

☞ Modes of Transmission of Whooping Cough:

- It spreads person to person.
- By direct contact when patient talks, sneezes, the bacilli are sprayed into the air.
- By droplet infection.

- It can also spread directly by droplet infection or indirectly through fomites recently contaminated with patients nasal and buccal secretions.
- Children commonly get infection from their playmates who are in nearly stages of disease.

☞ Prevention and Control Measures of Whooping Cough:

- Early detection of the disease.
- Isolation of the patient at the earliest.
- Treatment and disinfection of discharges from nose and throat of the patient.
- Every child must be immunized against "whooping cough".
- Cough preparations and antibiotics may be given to the patient.
- Infants should be protected from exposure to this disease.
- The affected children should not be allowed to go to school for a period of 6 weeks.

☞ Role of Pharmacist in Prevention of Whooping Cough:

The pharmacist may play an active role in the prevention of whooping cough by implementation in the following ways:

(i) Advise for immunization of child against "whooping cough".
(ii) Isolation of the patient and necessary care to be taken.
(iii) Active immunization by DPT vaccine is the effective way of controlling pertussis.
(iv) The pharmacist should explain the importance of vaccination, its proper timing for disease prevention.
(v) The pharmacist is a first healthcare provider for symptomatic treatment.
(vi) The pharmacist must provide information regarding antibiotic treatment and availability of other medicines useful to prevent and control whooping cough.
(vii) The pharmacist should advise the people or patients to cover the mouth during coughing, sneezing, etc. to prevent spread of infection.

11. Meningitis/Meningococcal Meningitis/Cerebrospinal Fever

- Meningitis is an acute communicable disease.
- Meningitis is an inflammation of brain and spinal cord; typically caused by an infection.
- Meningitis is usually caused by viral infection but can also be bacterial or fungal.

- Meningitis is an inflammation of the fluid and membranes (meninges) surrounding brain and spinal cord.
- The meningitis is a part of septicaemic process (specticaemia).

☞ **Causative Agent:**

It is caused by *Haemophilus meningitis or Neisseria meningitis*. It is a Gram-negative diplococci.

☞ **Incubation Period:**

Incubation period is usually 3 to 4 days but may vary from 2 to 10 days.

☞ **Signs and Symptoms of Meningitis (Clinical Features):**

- Headache, vomiting, stiffness
- Seizures, sensitivity to bright light
- Sleepiness
- Lethargy
- Decreased appetite
- Fever, irritability
- Altered mental status, confusion or disorientation.

☞ **Types of Meningitis:**

1. Viral meningitis
2. Bacterial meningitis
3. Fungal meningitis
4. Parasitic meningitis

☞ **Modes of Transmission of Meningitis:**

1. By contact of respiratory and throat secretions (saliva or spit)
2. By close contact, coughing or kissing.
3. By droplet infection through coughing and sneezing.
4. Indirect by contact with articles recently soiled with faeces or throat discharges from an infected person.

☞ **Causes of Meningitis:**

1. Chemical irritation
2. Fungi
3. Drug allergies
4. Cancer
5. Bacterial, viral infection

☞ **Prevention and Control Measures of Meningitis:**

1. Vaccination against meningococcal disease.
2. Careful washing of hand helps to prevent the spread of germs.
3. Practice of good hygiene. Not sharing drinks, food straws, eating utensils, lip balms or toothbrushes.
4. Improve housing and prevention of overcrowding.

5. Penicillin is the drug of choice.
6. Chemoprophylaxis with rifampicin or sulphadiazine is recommended.
7. Enhancing immune system.
8. Eating balanced diet rich in vegetables and fruits.
9. Exercising regularly, avoiding cigarettes, drugs and alcohol, etc.

☞ Role of Pharmacist in Prevention of Meningitis:

1. Pharmacists are in a key position to recommend appropriate antimicrobial therapy for the prophylaxis and treatment of bacterial meningitis.
2. To ensure that patients are receiving recommended vaccinations.
3. Pharmacists have a vital role in raising awareness of signs and symptoms of meningitis.
4. Pharmacist should give the following advices to the patient/ general public to prevent meningitis.
   (i) Keep the patient in isolated room/private room.
   (ii) Mask should be weared by the patient as well as visitors.
   (iii) Keeping up-to-date with recommended vaccines is the best defence against meningococcal disease.
   (iv) Maintaining healthy habits like plenty of water, not having close contact with people who are sick.
   (v) Health workers, physicians must wear face shield mask visiting wards/patients.
   (vi) Avoid kissing, sharing of food, utensils of the infected patient.
   (vii) Cover the mouth while coughing and sneezing.

12. Tuberculosis (S. 22, 23)

- Tuberculosis is a chronic infectious disease caused by tubercle bacilli.
- Tuberculosis is a specific disease which primarily affects lungs and causes pulmonary tuberculosis.
- It can also affect intestine, meninges of brain, bones, joints lymph glands, skin, and other tissues of the body.
- Tuberculosis can occur at any age but is more common in old persons than in young persons.

☞ Causative Agent:

Tuberculosis is a chronic infectious disease caused by *Mycobacterium tuberculosis.*

☞ Incubation Period:

The incubation period ranges from 3 to 6 weeks.

☞ Signs and Symptoms of Tuberculosis (Clinical peatures):

- Excessive fatigue
- General feeling of weakness
- Slight rise in temperature in the evening
- Slight palpitation and rapid pulse
- Chest pain
- Loss of weight
- Night sweating
- Chronic cough and hoarseness of throat
- Cheeks are flushed, eye sunken and the lips are dry
- The breath has peculiar odour.

☞ Modes of Transmission of Tuberculosis:

1. It is spread by droplet infection. When droplets are expelled by tubercular patient through coughing, sneezing, talking, and are inhaled by healthy person.
2. By inhaling fine dust particles containing tubercle bacilli derived from dried sputum and other infected discharges thrown on floor, walls, furniture, clothes, etc.
3. By handling sputum and other discharges of the tubercular patient.
4. By direct contact with the patient.
5. By consuming articles of food and drinks contaminated with tubercle bacilli.
6. By consuming milk derived from a cow suffering from tuberculosis and without proper boiling.
7. Flies play an important role in transmitting the disease by contaminating the articles of food and drink of healthy person with tubercle bacilli.

☞ Prevention and Control Measures of Tuberculosis:

1. Early detection of tuberculosis patient by the examination of sputum.
2. Infected patient should be isolated.
3. Immunization with BCG vaccine.
4. People should be given health education.
5. Milk should be consumed after proper boiling.

6. The people should be taught about importance of personal hygiene, maintaining good sanitation and clean environment, immunization.
7. While talking or coughing the patient should wear a face mask, or keep the handkerchief on the mouth.
8. The patient should not be allowed to spit here and there.
9. One should live in well-ventilated house.
10. Streets and building should be properly constructed, So as to provide plenty of open space.
11. Use of chemotherapeutic agents like INH, PAS, ethambutol.

☞ Role of Pharmacist in Prevention and Control of Tuberculosis:

The pharmacist should an important role in prevention of tuberculosis in the following ways:

- Creating awareness in the people about maintaining good hygiene, good sanitation and clean environment.
- Promote immunization with BCG vaccine.
- Give advise to the patient not to spit anywhere, cover the mouth with mask or handkerchief while coughing and sneezing, talking to avoid spread of infection.
- Isolation of the patient
- Advise on not sharing the utensils used by the patient and various disinfection methods.
- Not to go in public or crowded places.
- Keep the children away from such patient.
- Advise on taking boiled milk, water, etc.
- To make the anti-tubercular drugs available at the pharmacy for the times.
- He should inform the patient about DOTs therapy (directly observed therapy short-course).

13. Ebola

- Ebola is also known as Ebola virus disease (EVS) or Ebola hemorrhagic fever (EHF).
- Ebola virus causes severe bleeding, organ failure and can lead to death.
- Humans may spread the virus to other humans through contact with body fluids such as blood.

☞ Causative Agent:

Ebola is caused by an infection with a group of virus within the genus Ebovirus, i.e. Ebola virus. Ebola virus contains single-stranded, non-infectious RNA genomes.

☞ Signs and Symptoms of Ebola (Clinical Features):

1. Fever, sore throat.
2. Muscular pain and headaches
3. Joint pains
4. Loss of appetite
5. Vomiting, diarrhoea, rash
6. Decreased function of the liver and kidneys.
7. Internal bleeding
8. Stomach pain

☞ Mode of Spread / Transmission of Ebola:

1. By blood products
2. By uncleaned syringe, needles or unscreen blood.
3. By touching a contaminated surface (blankets)
4. By saliva (kissing or shared drinks)
5. Contact with blood or other body fluids such as vomiting, diarrhoea, urine, breast milk, sweat, semen of an infected person who has symptoms of Ebola.

☞ Prevention and Control Measures of Ebola:

- Avoid contact with blood and body fluids.
- Stay away from areas where the virus is common.
- Avoid the contact of bodies of anyone who has died from the disease.
- Avoid contact with wild animals like bats, monkeys and their meat.
- Avoid contact with articles that may have came in contact with an infected persons blood or body fluids.
- Immunization with Ebola vaccine.

☞ Role of Pharmacist in Prevention of Ebola:

- Pharmacists have a key role in understanding the nature of the disease, how it is transmitted.
- Pharmacist should inform, advise and educate the community to take due precautions.
- Pharmacist should store and supply appropriate product useful to treatment of Ebola.

- Pharmacist should encourage the individual and families with suspected cases of Ebola to take treatment from healthcare facilities.
- Pharmacist can create an awareness among the people to prevent the spread of Ebola disease by implementing following measures:
  (i) Avoid contact with infected person.
  (ii) Not touch the blood and body fluids of the patients.
  (iii) Immunization with Ebola vaccine.
  (iv) Counselling the people/patients about personal hygiene.

14. Poliomyelitis (Polio) (W. 22)

- Poliomyelitis or infantile paralysis is an acute infectious viral disease of human alimentary tract but may affect CNS (brain, spinal cord and nerves) resulting in paralysis.
- The legs are more affected than arms.
- Poliomyelitis is an exclusively human disease and the only source of virus is man.
- The faecal virus is the most important source of spread in the community.

☞ **Causative Agent:**

The causative organism of poliomyelitis is a filtrable virus which has 3 serotypes as type 1, type 2 and type 3. Type 1 virus is responsible for most of the outbreaks of polio epidemics.

☞ **Incubation Period:**

Incubation period of polio is 7–21 days but may vary from 3 to 35 days.

Polio virus may live in water for 4 months and in faeces for 6 months. Thus, it is well adopted for faecal-oral route of transmission.

☞ **Signs and Symptoms of Poliomyelitis (Clinical Features):**

- Mild illness when polio virus attacks CNS and produces varying degree of paralysis.
- Preparalytic symptoms include high fever, headache, chillness, diarrhoea, vomiting and pain all over the body.
- Children are drowsy but the adults are restless.
- Headache, stiff neck, evidences of meningitis.
- Flaccid paralysis
- There is foot drop, facial paralysis, and squinting of eyes.

☞ Mode of Transmission of Poliomyelitis:

- The polio virus is found in the nasopharyngeal secretions, faeces and urine of the patients and carriers.
- Faecal carriers are more dangerous than nasopharyngeal carriers.
- Faecal-oral route is the most common route of transmitting the disease.
- Infection can spread directly through contaminated fingers or indirectly through contaminated water, milk, food and other articles of daily use.
- Flies also play a major role in spreading disease.
- Polio may also spread through droplet infection during acute stage of disease when virus is present in pharynx.
- Close personal contact helps in spreading the disease.

☞ Prevention and Control Measures of Poliomyelitis:

1. Polio can be prevented by active immunization of all infants and children up to 5 years of age.
2. Oral polio vaccine (OPV) sabin type is widely used because it is cheap, easy to administer and gives immunity for a long period. OPV is a live attenuated liquid vaccine. The vaccine is stored at 4°C.
3. The patient should be isolated.
4. The faeces, urine and other discharges of the patient should be properly disposed of. The faeces remain infective for 4 weeks.
5. Proper provision for safe and adequate water supply and sanitary disposal of solid wastes should be made.
6. Hygienic conditions should be maintained.
7. Flies should be destroyed.
8. Avoid overcrowding in schools and other places of gatherings.
9. Antibiotics may be given to prevent respiratory complications.
10. Good nursing care, massage help the patient from sufferings (physiotherapy).

☞ Role of Pharmacist in Prevention of Poliomyelitis:

1. Pharmacist can play an important role in disease prevention by advocating and administering polio vaccines (OPV) of inactivated (salk) polio vaccine (IPO).
2. Pharmacist may play a role in patient education and general public regarding signs and symptoms and possibilities of infection.

3. Vaccination is the best way to prevent and eradicate poliomyelitis.
4. Pharmacist should involve voluntarily in the national polio vaccination programmes for the benefit of general public and community.
5. Pharmacist should guide the people in the following aspects to prevent the spread of the poliomyelitis by implementing following measures.
   - To make the provision of clean drinking water and improved hygienic practices and sanitation.
   - Immunization is the cornerstone of polio eradication.
   - Active immunization against poliomyelitis with OPO or IPO.
   - Hot milk and fluids should be given to the child.
   - Isolation of patient as per severity.
   - Disinfection and proper disposal of soild wastes.
   - Destruction of flies nearby the houses.
   - Avoiding overcrowding in the schools and other places of gathering.
   - Pharmacist may create awareness regarding government programmes like pulse polio immunization (PPI).

15. Hepatitis/Viral Hepatitis

- Liver can be infected by a number of viruses.
- Viral hepatitis is defined as an infection of the liver by any of the viruses.
- A, B, C, D, E varieties are known as HAV, HBV, HCV, HDV, HEV and HGV respectively.
- The common among these varieties are HAV and HBV.
- Viral hepatitis is widely prevalent in India.

(A) **Hepatitis A (HAV)**

- It was formerly called infectious hepatitis or epidemic jaundice.
- It is an acute infectious disease of liver which starts with non-specific symptoms like fever, chills, headache, generalized weakness, pains followed by anorexia, nausea, vomiting, dark urine and jaundice.

☞ **Causative Agent:**

Hepatitis A is an acute infectious disease of liver caused by hepatitis A virus (HAV).

☞ Incubation Period:

Incubation period is usually 25 to 30 days ranging from 15 to 45 days.

☞ Signs and Symptoms (Clinical Features):

- Fever, chills
- Nausea, vomiting
- Headache
- Dark urine
- Generalized weakness
- Jaundice
- Pains followed by anorexia
- Abdominal pains
- Fatigue

☞ Mode of Spread/Transmission of Hepatitis A:

(i) **Faecal-oral route:** It is spread through contaminated water and food.

(ii) **Direct contact:** It can occur directly from person to person or indirectly by using contaminated water, milk, food, etc.

(iii) **By sexual transmission:** This may occur among homosexual men.

☞ Prevention and Control Measures of Hepatitis A:

1. Isolation of hepatitis cases.
2. Disinfection of faeces and fomites and the patient.
3. Anti-fly measures should be taken.
4. Needles and syringes should be properly sterilized.
5. Human normal immunoglobulin should be administered to all contacts before or within a week of exposure.
6. Follow personal and community hygienic measures such as washing of hands after toilet and before meals, sanitary disposal of human excreta.
7. Safe water must be provided.

☞ Role of Pharmacist in Prevention of Hepatitis A:

Pharmacist may play a role by creating awareness in the people for the prevention of hepatitis A:

- Adopting person and community hygienic measures.
- Use of safe drinking water

- Avoid homosexual contact.
- Use of anti-fly measures.
- Reporting the symptomatic cases at the earliest.
- Encourage the peoples for active immunization of hepatitis A vaccine.

(B) **Hepatitis B (HBV)**

- This is also called serum hepatitis.
- Hepatitis B is a major systemic infection with major pathology in liver.

☞ **Causative Agent:**

Hepatitis B is caused by hepatitis B virus (HBV) which affects the liver.

☞ **Incubation Period:**

- Incubation period of hepatitis B is 45 to 180 days.

Signs and Symptoms of Hepatitis B (Clinical Features):

- Headache, nausea, vomiting
- Generalized weakness (fatigue)
- Dark urine
- Jaundice
- Pain followed by anorexia
- Abdominal pain

☞ **Modes of Spread/Transmission of Hepatitis B:**

(i) Parenteral route: Through infected blood and blood products, dialysis, contaminated needles and syringes, tattooing, etc.
(ii) Transmission from HBV carrier mothers to their babies.
(iii) Transmission by sexual contact or even by kissing.
(iv) Blood sucking arthropods such as mosquitoes can transmit the disease.

☞ **Prevention and Control Measures of Hepatitis B:**

1. Avoid blood transfusion and its products which are contaminated with hepatitis B virus.
2. By the use of sterile syringes and needles.
3. By giving hepatitis B vaccine by intramuscular route.
4. Hepatitis B immunoglobulin (HBIg) should be given immediately to the persons who are exposed to hepatitis B virus.
5. Health education to the community.

☞ Role of Pharmacist in Prevention and Control of Hepatitis:

Pharmacist should advise the people and patients to take the following measures to control the hepatitis B:

- Active immunization with hepatitis B vaccine.
- Educate the people about personal hygienic status.
- Protection from mosquitoes.
- Use of sterile syringe and needles.
- Precautions during dialysis, tattooing, etc.
- Making the drugs available for the treatment of hepatitis B.
- Pharmacist should advise that blood donors should be free from HBV infection.
- Carries should be instructed not to shave razors or toothbrushing and use barrier methods of contraception.

16. Cholera (S. 23)

- Cholera is an acute diarrhoeal disease
- It is both an epidemic and endemic disease
- Cholera is an acute infectious disease of the intestinal tract characterised by sudden onset of severe diarrhoea and vomiting leading to rapid dehydration.
- It occurs in summer and autumn and generally fades a way with the onset of winter.
- It affects all ages.

☞ Causative Agent:

Cholera is caused by an agent *Vibrio cholerae*.

☞ Incubation Period:

Incubation period is from few hours to 5 days averaging to 1–2 days.

☞ Signs and Symptoms of Cholera (Clinical Features):

- Onset of severe diarrhoea and vomiting.
- Intense thirst.
- Cramps in the legs and abdomen.
- Supression of urine followed by dehydration.
- Sunken eyes, hollow cheeks, scaphoid abdomen, subnormal temperature.
- Washer man's hands and feet.
- Reduced or feeble pulse.
- Un-recordable blood pressure.
- Loss of skin elasticity.

- Shallow and quick respiration.
- Depth may occur due to severe dehydration.

☞ Modes of Spread/Transmission of Cholera:

(i) It spreads by ingestion of contaminated water, food, milk, milk products, with discharge of patient.
(ii) By careless handling of excreta and vomites of infected persons.
(iii) By direct contact, i.e. person to person transmission through contaminated fingers.
(iv) Flies can act as mechanical carriers.

☞ Prevention and Control Measures of Cholera:

1. Detection of the cases as early as possible and immediate notification to health authorities.
2. Isolation of the patients in the hospital or at home.
3. Immediately start ORS (oral rehydration therapy).
4. Patient's clothes and utensils should be thoroughly disinfected.
5. Patient's stools and vomits should be collected in a pot containing some disinfectant and disposed of immediately.
6. All latrines and drains, etc. should be cleaned with phenyl or bleaching powder.
7. Milk must be boiled before use.
8. Anti-fly measures should be taken.
9. All the food, drinks and sweets must be protected against flies.
10. Special care must be taken regarding the cleanliness of surrounding as well as personal hygiene.

☞ Role of Pharmacist in Prevention of Cholera:

The pharmacist plays an important role in the prevention and control of cholera as follows:

- To make available the ORS powder or liquids
- Tell the importance of rehydration to the patient
- In severe cases patients are advised to have saline and consultation of doctors.
- He should tell the benefits of early reporting for prompt treatment.
- Follow food hygiene practices
- Hand washing after defaecation and before eating.
- Benefits of cooked, hot food and safe water.

17. Acute Diarrhoeal Diseases (S. 24)

- Diarrhoea is defined as the passage of loose, liquid or water stools.
- These liquid stools are usually passed more than 3 times a day.
- The term "Diarrhoeal diseases" indicate a group of diseases in which the predominant symptom is diarrhoea.
- Diarrhoea lasting for 3 weeks or more is called chronic, otherwise it is termed acute diarrhoea.

☞ Causative Agent:

Diarrhoea is almost universally infectious in origin. A wide-range of organisms cause diarrhoea.

☞ Organisms Causing Diarrhoea are:

(a) Viruses: Enteroviruses, Coronaviruses, Rota viruses, Astro viruses.
(b) Bacteria: *Vibrio cholerae*, Salmonella, Shigella, *Bacillus cereus, Escherichia coli*.
(c) Other: *Entamoeba histolytica,* intestinal worms, *Giardia intestinalis,* trichuriasis.

☞ Signs and Symptoms of Acute Diarrhoeal Diseases (Clinical Features):

- Frequent loose watery stools
- Abdominal cramps
- Abdominal pain
- Fever
- Bleeding
- Lightheadedness or dizziness from dehydration

☞ Mode of Spread/Transmission of Acute Diarrhoeal Diseases:

(1) By faecal–oral route
(2) Food-borne or water-borne—by contaminated hands or ingestion of contaminated food or drinks.
(3) Direct transmission through fingers, fomites or dirt if contaminated.

☞ Prevention and Control Measures of Acute Diarrhoeal Disease:

(1) By improving water supply, improved disposal of excreta, improved domestic and food hygiene.
(2) Adequate supply of clean water.

(3) Washing of hands before preparing food and defaecation.
(4) Avoid eating of food from street.
(5) Eat only cooked vegetables.
(6) By avoiding contact with infectious agents.

☞ Role of Pharmacist in Prevention of Acute Diarrhoeal Diseases:

Pharmacist can provide following guidance, services to the general public in prevention of diarrhoeal diseases.

- Inform the people about availability and use of ORS.
- Use of good quality water, proper sanitation and pure drinking water.
- Avoid contaminated food or food from streets.
- Health education to public in general hygiene.
- Disposal and disinfection of excreta.
- Immunization against measles is a potential intervention for diarrhoea control. The measles vaccine can prevent up to 25% of diarrhoea deaths in children under 5 years of age.
- Flies control must be done.

18. Typhoid (S. 24, 23, W. 22, 23)

- Typhoid fever is characterised by fever 3 to 4 weeks, relatively bradycardia, with involved of lymphoid tissue and constitutional symptoms.
- Typhoid fever is also known as typhoid and is a bacterial infection due to specific type of Salmonella that causes the symptoms.
- Typhoid is a result of systemic infection.
- The term "enteric fever" includes both typhoid and paratyphoid fevers.
- Typhoid fever occurs in all parts of the world and throughout the year but more in summer and rainy season.
- The disease affects all ages but more common between 10 and 30 years. It is most common in school going children.

☞ Causative Agent:

Typhoid fever is an acute communicable disease caused by *Salmonella typhi.*
Paratyphoid fever is caused by *Salmonella paratyphi A, B or C.*

☞ Signs and Symptoms of Typhoid (Clinical Features):

- Nausea, vomiting, diarrhoea
- Cough, headache

- Show pulse rate and fever
- Fever continues for 2 to 3 weeks
- Bradycardia
- Weakness, tiredness
- Weight loss
- Poor appetite
- Abdominal pains
- Enlargement of spleen.

☞ Modes of Spread or Transmission of Typhoid:

1. Typhoid fever is transmitted via the faecal-oral route or urine-oral route
2. The direct transmission is also possible through contaminated hands or fingers.
3. Indirect transmission occurs by ingestion of contaminated water, milk or food or through flies.

☞ Prevention and Control Measures of Typhoid:

(i) Isolation of the patient to prevent further spread of disease.
(ii) Water and milk should be consumed only after boiling.
(iii) Excreta and urine of infected person should be disposed of in a sanitary way.
(iv) Detection of typhoid carriers and treatment.
(v) Immunization with antityphoid vaccines.
(vi) Anti-fly measures should be done.
(vii) Public should be educated for sanitation and personal hygiene.
(viii) Provision of safe drinking water, boiled milk is necessary.
(ix) Public should be immunized with TAB vaccine which contains. *S. typhi, S. paratyphi A and S. paratyphi B*
(x) Immunisation is done injecting subsequently two doses each of 0.5 ml at an interval of 7–10 days. Booster doses are required to be given every third year.
(xi) Chloramphenicol is the drug of choice in the treatment which should be given by mouth in the doses of 500 mg four times a day.
(xii) The stools and urine should be passed in a closed containers containing some disinfectant.
(xiii) All the beddings, bed sheets, towels, pillow covers and other articles used by the patient should be thoroughly disinfected and cleaned.

☞ Role of Pharmacist in Prevention of Typhoid:

The pharmacist should guide and create awareness in the public regarding precautions to be taken to prevent typhoid. The following are important measures:

1. **Control of reservoir:** It involves control by identification, isolation, treatment and disinfection of reservoirs. The carriers should be kept under surveillance.
   - Carriers should be prevented from handling of food, milk or water.
   - Health education of the carries about washing of hands with soap, after defaecation or urination and before preparing food is very essential.
2. **Control of sanitation:**
   The pharmacist should guide the people about protection, purification of drinking water supplies, improvement of basic sanitation and promotion of food hygiene to prevent transmission of disease.
3. **Immunization:**
   The pharmacist must guide the people about immunization and its importance. Immunization lowers the incidence and seriousness of the infection.
   The immunization is recommended to those living in endemic areas, household contacts, group at risk of infection such as school going children and hospital staff, travellers, people attending *melas* and *yatras.*
4. Pharmacist should make the drugs available for the treatment and also the availability of antityphoid vaccines such as monovalent anti-typhoid vaccine, bivalent anti-typhoid vaccine, TAB vaccine.

19. Amoebiasis

- Amoebiasis is a parasitic infection of the colon caused by amoeba *Entamoeba histolytica*.
- Amoebiasis infection is most common in tropical areas with untreated water.
- It spreads through drinking or eating uncooked food, etc.
- Amoebiasis is the condition of harbouring the protozoan parasite without clinical manifestations.

☞ Causative Agent:

Amoebiasis is a parasitic infection caused by agent *Entamoeba histolytica.* It exists in two forms: (a) Trophozite, (b) Cystic.

☞ Incubation Period:

The average incubation period of amoebiasis is 2–4 weeks.

☞ Signs and Symptoms of Amoebiasis (Clinical Features):

- Loose stools
- Mild abdominal cramping
- Frequent, watery and/or blood stools with severe abdominal cramping may occur
- Nausea
- Loss of appetite
- Fever

☞ Modes of Transmission of Amoebiasis:

- The parasite lives only in humans are passed in the faeces of an infected person.
- It can spread sexually by oral–anal contact.
- It can be transmitted through contaminated food, water, etc.

☞ Prevention and Control Measures of Amoebiasis:

1. Eradicating faecal contamination of food and water through improved sanitation hygiene and water treatment.
2. Public education on the importance of personal hygiene.
3. Public education about importance of hand hygiene, after defaecation and before preparing or eating food.
4. Providing information to intending travellers about the risks involved in eating uncooked vegetables and fruits and drinking contaminated water.
5. Public education about possibility of transmitting the disease via sexual contact.
6. Boiling and purifying water before consumption in endemic areas.

☞ Role of Pharmacists in Prevention of Amoebiasis:

Pharmacists should create awareness in the public in implementing following measures:

1. Awareness of clean food, water and good sanitation conditions.
2. Availability of popular drugs, e.g. metronidazole.

3. Pharmacist should educate the people about modes of transmission of disease.
4. Pharmacist should guide the people to wash the fruits or vegetables before eating.
5. Tell the importance of isolation of the patient.

20. Worm Infestations

- Worm infestation occurs in humans when parasitic worms (intestinal worms) live and growth inside the body.
- There are three types of hookworms responsible for intestinal infections:
  - (i) Ascaris — *Ascaris lumbricoides*
  - (ii) Ancylostoma — *Ancylostoma duodenale or Necator americans*
  - (iii) Guinea worm — *Dracunculus medinensis*
- Worm infestations are long-term diseases that produce a few symptoms in their early stages and sometimes serious effects at well-developed stages or may be quite fatal at times.
- The common worm infestations are caused by thread worm, roundworm, hookworm, etc.
- Helminthiasis: Helminth is a general term meaning worm. The helminths are invertebrates characterized by elongated, flat or round bodies.
- Helminthology is the study of parasitic worms and their effects on the hosts.
- Helminthiasis is a parasitic disease caused by infection of helminths or worms.

Causative agent: Hookworm infection is caused by two types of hookworms: *Ancylostoma duodenale* and *Necator americanus.*

Mode of Transmission

i. A single female worm may lay 10,000 to 20,000 eggs per day which are passed in faeces.
ii. When they happen to be laid on warm moist soil, the eggs hatch into larvae (in about 5 days time) where they grow and develop into infective larvae.

When a person walks bare foot on the contaminated soil, the infective larvae penetrate the skin and enters the body of healthy person.

From the skin they enter into the blood-stream and are carried into the heart and from the heart into the lungs and reach, up to trachea and pharynx from where they are swallowed and reaches to small intestine where they develop into sexually mature worms and starts laying eggs in about 6 weeks.

Symptoms/characteristics/ill effects of hookworm infection (clinical features):

i. Iron deficiency anemia
ii. Joint pains
iii. Abdominal pains
iv. Oedema
v. General weakness
vi. Loss of body resistance.

Preventive and control of hookworm infestation:

i. To prevent soil pollution use of sanitary latrines should be promoted in rural areas.
ii. Defecation in the open area should not be permitted because when the moist soil is contaminated with faeces, it leads to development of larvae of hookworm.
iii. Habit of walking bare-footed should be avoided.
iv. Sources of water supply should be protected from contamination with human excreta.
v. Public should be educated for proper use of sanitary latrines as well as personal hygiene especially washing hands after defecation and before taking meals.

☞ Role of Pharmacist in Prevention of Hookworm Infestation:

The pharmacist helps the general public regarding prevention of hookworm infestation by implementing following measures:

1. Sanitary disposal of human excreta in a proper way.
2. Chemotherapy by using certain anthelmintic drugs such as piperazine, mebendazole, albendazole, pyrantel.
3. Treatment of anemia by giving/advising ferrous sulphate 200 mg, 3 times a day orally.
4. Health education to the people regarding sanitary latrines, prevention of soil pollution, personal hygiene.

21. Food Poisoning

Food poisoning is an acute gastroenteritis caused by ingestion of food or drink contaminated with either living bacteria or their toxins or chemical substances.

☞ Types of Food Poisoning

i. Chemical food poisoning.
ii. Food poisoning from plants and animals.
iii. Food poisoning by bacteria and their toxins.

- *Chemical food poisoning*: It is caused by ingestion of chemical poisons such as arsenic, cadmium, cyanide, fluorides, fertilizers, pesticides.
- *Food poisoning from plants and animals*: Ingestion of certain varieties of poisonous mushrooms may cause food poisoning.
  Food poisoning by bacteria and their toxins: Food poisoning by bacteria and their toxins is the commonest cause of food poisoning which is generally caused by ingestion of food and drinks contaminated with bacteria and their toxins.

Bacterial food poisoning is of following types:

i. *Salmonella food poisoning*: It is caused by Salmonella group of microorganisms which includes *S. typhi* and *S. enteritidis.* Foods like milk, milk products, eggs, meat, fish and stored food get contaminated with these bacteria.
ii. *Staphylococcus food poisonings*: *Staphylococcus aureus* causes poisoning in food which spreads from ice-creams, milk, milk products, cakes, etc.
iii. *Botulism*: It is a fatal form of food poisoning which is caused by the ingestion of food contaminated with neurotoxins produced by *Clostridium botulinum* which in under-processed, preserved foods, preserved pickles, fruits, vegetables, etc.

☞ Signs and Symptoms of Food Poisoning:

- Nausea
- Vomiting
- Watery or bloody diarrhoea
- Abdominal pain and cramps
- Fever

☞ Prevention and Control:

(i) Food should be freshly prepared and eaten at the same time.
(ii) Foods must be protected against flies, rats, mice, and dust.

(iii) Surplus food should be kept in a refrigerator or cool place.
(iv) Personal hygiene and food sanitation should be ensured by the individual particularly engaged in the handling, preparation and cooking of the food.
(v) It should be checked that food animals and meat should be free from any kind of disease.
(vi) Restaurants, hotels and messes or places where food is cooked should be supervised strictly for the quality and hygienic cooking methods.

☞ Role of Pharmacist in Prevention of Food Poisoning:

The pharmacist can create awareness among the people to prevent food poisoning in the following ways:

1. Handling, preparation, cooking and storage of food in a protective way.
2. Food handlers should not be suffering from infected wounds, boils, diarrhoea, dysentry, through infections, etc.
3. Medical check-up of food handlers is must.
4. Milk, milk products, egg products should be pasteurized.
5. Proper sanitization of all work surfaces, utensils, and equipment.
6. Food premises must be free from rats, mice, flies and dust.
7. Food handlers should be educated about clean habits and personal hygiene.
8. Keeping the uneaten food in cold storage to prevent bacterial multiplication and toxin production.
9. Food samples are periodically checked in the laboratories.
10. Continuous surveillance is necessary to avoid outbreaks of food-borne diseases.
11. Washing of hands well with warm, soapy water before and after preparation of food. Use hot, soapy water to wash utensils, cutting boards and other surfaces used.

☞ Important Question

Write a note on botulism.

Botulism is a fatal form of food poisoning which is caused by the ingestion of food contaminated with neurotoxins produced by *Clostridium botulinum* which is found in under-processed, preserved foods, preserved pickles, fruits and vegetables, etc.

- The optimum temperature for growth of this bacteria and for the production of toxins is considered to be 37°C.
- The *Clostridium botulinum* can withstand storage conditions and remain present in precooked frozen foods.
- The symptoms of botulism appear within 12–20 hours after the consumption of food.
- The symptoms include:
  i. Nausea and vomiting, headache
  ii. Diarrhoea, dryness of mouth
  iii. Double vision
  iv. Decreased salivary secretions
  v. Death may occur in 4–6 days due to heart or respiratory failure.
- *Clostridium botulinum* can withstand moist heat at 100°C for several hours.
- They are destroyed by moist heat at 120°C usually within 5 minutes.

22. Dengue (Dengue Fever) (W. 22, S. 23, 24)

- Dengue is a mosquito-borne viral disease occurring in tropical and subtropical areas.
- Dengue is a viral disease belonging to the group of arboviruses, capable of infecting humans causing a disease.

☞ Causative Agent:

- The causative agent of dengue is a virus called dengue virus (DENV)
- The arbovirus is transmitted through vector mosquitoes, *Aedes aegypti* and *Aedes albopictus*.
- Dengue virus occurs in four serotypes: 1, 2, 3, 4.

☞ Incubation Period:

4 to 10 days.

☞ Signs and Symptoms of Dengue (Clinical Features/Presentations):

- Headache, fever
- Exhaustion
- Severe muscle and joint pain
- Swollen lymph nodes

- Rash
- Photophobia
- Extreme weakness
- Anorexia
- Skin eruptions
- Constipation
- Altered taste sensation
- Colic pain
- Abdominal tenderness
- Sore throat
- General depression
- Fever lasts for about 5 days

☞ Modes of Transmission/Spread of Dengue:

- The reservoir of infection is both man and mosquito.
- The transmission of cycle is "Man-Mosquito-Man".
- Aedes mosquito becomes infective by feeding on a patient from the day before onset of the 5th day of illness. This is termed viremia (viremia is a medical term for viruses present in the blood stream).
- Dengue fever is a disease caused by a family of viruses transmitted by infected mosquitoes.
- Dengue viruses are spread to the people through the bite of infected Aedes species mosquitoes.
- It can be spread directly from one person to another person.
- Humans are known to carry the infection from one country to another during the stage when the virus circulates and reproduces in the blood stream.

☞ Two Different Conditions of Dengue Fever:

(a) Dengue haemorrhagic fever (DHF)
  - It is a severe form of dengue fever, caused by infection with more than one dengue virus.
  - DHF is transmitted by *A. aegypti,* following an incubation period of 4–6 days.
  - The symptoms are high fever, facial flushing, headache, anorexia, vomiting, epigastric discomfort, tenderness at the right costal margin and generalized abnormal pain.

(b) Dengue shock syndrome (DSS)
- It has clinical manifestations of DHF along with shock represented by rapid and weak pulse with narrowing of pulse pressure (20 mm Hg or less) or hypotension, with presence of cold, clammy skin and restlessness.

☞ Prevention and Control Measures of Dengue/Dengue Fever:

1. Control on mosquitoes by using insect repellants, nets, wearing long sleeved shirts and long pants, etc.
2. Elimination of breeding places of mosquito.
3. Avoidance of man–mosquito–virus contact.
4. Drinking water storage containers are to be drained at the interval of 3–4 days.
5. Proper cleaning of overhead water storage tanks, never leave the tank uncovered.
6. Control larval habitats.
7. To ensure prompt diagnosis of cases of fever and appropriate treatment.

☞ Role of Pharmacist in Prevention of Dengue/Dengue Fever:

The pharmacist plays a key role by creating awareness among the community in the following ways to control and prevent dengue fever.

1. Avoiding accumulation of unhygienic water.
2. Proper cleaning of water storage tanks and covering the tanks.
3. To control the mosquito breeding near the houses using insecticides kerosene and Gumbusia fish, etc.
4. Use of mosquito repellents (Odomos, Good knight mats, etc.) mosquito nets, long shirts and pants to cover the body.
5. Health education to the people about cleanliness and sanitation.
6. Isolation of the infected patient under bed nets during first few days can provide individual protection against mosquitoes.

23. Malaria (S. 22, 23)

- Malaria is a protozoal disease caused by the infection of parasite.
- The term malaria is derived from two Italian words, i.e. *mal* means bad and *aria* means air.
- Malaria is a mosquito-borne disease caused by the malarial parasite (Plasmodium) which belongs to class protozoa.

- The incidence of malaria is maximum from April to November. This period is quite favourable for mosquito breeding and female mosquitoes bite human being for sucking blood.
- Malaria fever persists for a long time and may prove very dangerous and sometimes may lead to death of the patient.

☞ Causative Agent:

Malaria is caused by malarial parasites such as:

(i) *Plasmodium vivax*
(ii) *Plasmodium falciparum*
(iii) *Plasmodium malariae*
(iv) *Plasmodium ovale*

☞ Incubation Period:

It ranges from 12 to 14 days.

☞ Signs and Symptoms of Malaria (Clinical Features):

The signs and symptoms of malaria appear in three successive stages:

(a) **Cold stage:** It is characterised by sudden onset of fever which rises rapidly, headache, bodyache and shivering. This stage lasts for 15 minutes to one hour.

(b) **Hot stage:** It is characterised by severe headache and very hot flushing of the body and the patient feels like casting off the clothes. This stage lasts for 2 to 6 hours.

(c) **Sweating stage:** After the last stage there is profuse sweating and temperature becomes normal but the patient feels exhausted. This stage lasts for 2 to 4 hours.

If the infection persists, gradual anaemia develops and the liver and spleen are enlarged.

☞ Modes of Transmission of Malaria:

(a) **Vector transmission:** Malaria is commonly transmitted by the bite of certain species of infected female anopheles mosquitoes.

(b) **Direct transmission:** Malaria can be transmitted by infected needles, blood transfusions, etc.

(c) **Congenital infection:** Rarely this can occur in the newborn from infected mother.

☞ Life Cycle of the Malarial Parasite

There are two stages in the life cycle of the malarial parasite, first in the man called asexual cycle and the other in the female anopheles mosquito called the sexual cycle.

(i) **Asexual cycle or schizogony:** During this cycle the infected female anopheles mosquito bites a healthy person and sucks the blood, at this stage she injects salivary fluid containing sporozoites in the blood circulation. Sporozoites enter the liver where they undergo developmental changes and multiply in the red blood cells of the infected person and give rise to clinical attack of malaria.

(ii) **Sexual or mosquito cycle or sporogony:** This cycle takes 10–14 days to be completed in the female anopheles mosquito. The infective form of the malarial parasite known as sporozoites find their way into the salivary glands from the body cavity of the mosquito and when the female anopheles mosquito bites a healthy person, it sucks the blood and injects salivary fluid containing sporozoites in the blood circulation thus causing malaria.

☞ Prevention and Control Measures of Malaria:

The following measures should be taken for the prevention of malaria:

(i) Do not allow to collect water around the house and the locality.

(ii) The water meter as well as overhead tanks should not leak or overflow.

(iii) Do not allow to collect the refuse in the dustbins. They should be cleaned regularly and refuse disposed of in a sanitary manner.

(iv) Do not throw the broken earthen pots and other discarded containers/tins/tyres, etc. on your roof top because water may collect there which will act as breeding place for mosquitoes.

(v) Do not store water in open containers.

(vi) All water containers, coolers, flowerpots, etc. should be emptied once a week, cleaned and dried and then used again.

(vii) All weeds and wild growth should be removed from the locality as well as banks of small drains and canals so as to eliminate breeding place for mosquitoes.

(viii) All drains should be regularly cleaned and sprayed with DDT, BHC or slaked lime.

(ix) Kerosene oil or any other larvicide oil should be sprayed over stagnant water so as to kill mosquito larvae.
(x) Larvicidal fish 'Gambusia fish' should be grown in ponds which will eat mosquito larvae.
(xi) While sleeping in the open, mosquito net should be used.
(xii) Mosquito repellants should be used.
(xiii) Mosquito-proof clothes should be used to prevent bite of mosquitoes.
(xiv) Adult mosquitoes should be destroyed by spraying the insecticides like:
  (a) DDT (dichloro-diphenyl-trichloroethane). It is a residual insecticide which is commonly used in the form of emulsion or oily solution for spraying. After the evaporation of the solvent, minute crystals of the insecticide remain on the surface of walls. Mosquitoes have a tendency that after sucking blood they rest on walls and roof of the room, when they rest on these surfaces for some time, they absorb some of the DDT through their legs and get themselves poisoned and die after sometime.
  (b) 50% DDT, kerosene oil solution.
  (c) Pyrethrum, DDT, kerosene oil mixture (Flit).
  (d) BHC (benzene hexachloride).
  (e) Dieldrin.
(xv) Various types of mosquito traps are available in the market which should be used. The mosquitoes are caught in the traps and subsequently killed.
(xvi) Health education should be given to the public.

☞ Role of Pharmacist in Prevention of Malaria:

The pharmacist helps in prevention of malaria by implementing following measures in the people as well as community.

- Pharmacist can create an awareness in the public by health education.
- Pharmacist should guide the people about national malaria eradi cation programmes implemented by Government of India.

I. Measures to be taken by the individual:

1. Prevention of man/vector contact by using repellents, protecting clothing, bed nets, etc.
2. Destruction of adult mosquitoes by domestic sprays.
3. Destruction of mosquito larvae by peridomestic sanitation intermittent drying of water containers.

4. Source reduction of mosquitoes by filling, small-scale drainage, and other forms of water management.
5. Measures against malaria parasite which include chemoprophylaxis and chemotherapy.

II. Measures to be taken by the community:

1. Prevention of man/vector contact—site selection and screening of houses.
2. Destruction of adult, mosquitoes—residual spraying or space spraying of insecticides.
3. Destruction of mosquito larvae—using larvicides (chemical and biological).
4. Source reduction—prevention of man made malaria, environmental sanitation, water management, drainage schemes.
5. Measures against malaria parasite—presumptive treatment, radical treatment, mass drug administration.

24. Filariasis (Lymphatic Filariasis) (S. 24)

- It is a communicable disease which transmitted through mosquito bites and mainly affecting lymphatic system, hence known lymphatic filariasis.
- This disease is not fatal, but is a cause of great suffering, deformity and disability.
- Lymphatic filariasis is an insect borne disease caused by certain nematodes of the family filaridae and is a major public health problem in India.
- The filariasis is the term used for infection with three worms (nematodes), namely *W. bancrofti, B. malayi* and *B. timori.*

☞ Causative Agent:

Lymphatic filariasis is a mosquito brone disease caused by the filarial parasites *W. bancrofti* and *B. malayi.*

☞ Incubation period

Incubation period is 6–18 months (average 9 months).

☞ Signs and Symptoms of Filariasis (Clinical Features):

- Fever
- Lymphangitis
- Lymph adenitis
- Elephantiasis of scrotum

- Legs and arms swelling
- Itchy skin
- Abdominal pain, chest pain
- Muscle pain (myalgias)
- Enlarged liver and spleen
- Swelling body parts

☞ Modes of Transmission of Filariasis:

1. It spreads through bite of infective female culex mosquito.
2. The culex mosquito sucks the blood of an infected person during the night and transmits the disease.
3. The infection is more common during hot and humid climate which is favourable for mosquito breeding and their development.

☞ Prevention and Control of Filariasis:

(i) Protection from mosquito bite by using mosquito nets, repellant creams, etc.
(ii) Early detection and prompt treatment.
(iii) Use of insecticides, sanitary disposal of wastes, prevention of mosquito breeding.
(iv) Periodic blood examination.
(v) Providing health education to the public.
(vi) Diethyl carbamazine (DEC) is the drug of choice for treating filariasis.

☞ Role of Pharmacist in Prevention of Filariasis:

The pharmacist can play active role in prevention of filariasis by creating awareness in general public by adopting following measures:

- Making the drugs available in the shop, e.g. DEC, Ivermectin.
- To avoid mosquito breeding near the residential places.
- Cleaning of water storage tanks and covering with lids.
- Removal of weeds and wild growths in the residential localities, small drains which eliminates breeding places of mosquitoes.
- All drains should be spread with DDT, BHC, etc.
- Kerosene oil or larvicide oil should be sprayed over stagnant water.
- Larvicidal fish “Gambusia fish” should be grown in the ponds.
- Use of mosquito repellents.
- Use of mosquito nets.
- Health education to the community.

25. Chikungunya (S.22)

- Chikungunya is a viral infection transmitted by mosquitoes.
- In late 2013, chikungunya was found for the first time in the America on the islands of Caribbean.
- Animal reservoirs of the virus include monkeys, birds, cattles and rodents.
- These mosquitoes bite mostly during the daytime.

☞ Causative Agent:

It is caused by the chikungunya virus (CHIKV). It is an alpha virus with a positive-sense, single-stranded RNA genome of about 11.6 kb.

☞ Incubation Period:

The incubation period is typically 3–7 days (range, 1–12 days)

☞ Signs and Symptoms of Chikungunya (Clinical Features):

- Chikungunya usually starts suddenly with fever, chills, headache, nausea, vomiting.
- Joint pain and rash.
- Fatigue.

☞ Modes of Transmission of Chikungunya:

- Aedes mosquitoes transmit chikungunya virus to people.
- Chikungunya virus is transmitted to the people through mosquito bites.
- Mosquitoes become infected when they feed on a person already infected with the virus.
- Humans serve as a major reservoirs during epidemic.
- These mosquitoes are active throughout daylight hours, although there may be peaks of activity in the early morning and late afternoon.

☞ Prevention and Control of Chikungunya:

- The best way to prevent chikungunya is to protect yourself from mosquito bites.
- Use of insect repellent, wearing long-sleeved shirts and pants, treat clothing, take steps to control mosquitoes indoors and outdoors.
- Stop the breeding of mosquitoes which are found in standing water around the home.
- Cover all drums, tanks, barrels and buckets used to store water.

- Use mosquito coils and electric vaporization mats both day and night.
- Use mosquito nets and window netting (mesh).

☞ Role of Pharmacist in Prevention of Chikungunya:

The pharmacist may create an awareness in the peoples in prevention of dengue by implementing following measures:

1. Use of mosquito repellents, coils, vaporizers, mosquito nets, etc.
2. When working outdoors during day times, wear long-sleeved shirts and long pants to avoid mosquito bite.
3. Stop the breeding of mosquito near the residential places.
4. Emptying and drying the water containers once in a week.
5. Straining of stored water by using a clean cloth once a week to remove the mosquito larvae from water and water can be reused.
6. The pharmacist can involve in the survey activities during outbreaks of chikungunya.
7. The pharmacist should make the medicines available for the patients.

26. Trachoma

- Trachoma is a chronic communicable disease of the eye and is an important cause of blindness in the world.
- More than 15% of world's population suffer from trachoma.
- Trachoma is more common in early summer and monsoon and is related to fly breeding.
- The children of both sexes are affected more from this disease specially living in unhygienic conditions and overcrowded places.
- It is also common in schoolchildren.

☞ Incubation period:

The incubation period varies from 5 to 12 days.

☞ Causative agent:

Trachoma is caused by a virus called *Chlamydia trachomitis* that attacks mucous membrane covering the surface of the eyeball and living of the eyelids.

☞ Signs and Symptoms of Trachoma (Clinical Features)

- Development of granular elevations in the conjunctiva (outer covering of the eye).
- Keratoconjunctivitis

- Epithelial keratitis
- Progressive scarring with deformities of the eyelids.
- Secondary bacterial infection.
- Blindness.

☞ **Mode of Transmission of Trachoma:**

i. Direct or indirect contact with ocular discharges of infected persons.
ii. Contact with infected towels, clothes, handkerchiefs, fingers, etc.
iii. Swimming pools where water gets contaminated also acts as a source of infection.
iv. Flies also play a major role in spreading trachoma.
v. Poor personal hygiene, overcrowding, poverty and malnutrition are the contributory factors to spread this disease.

☞ **Prevention and Control of Trachoma:**

i. Early diagnosis and treatment of the trachoma cases.
ii. Antifly measures should be taken.
iii. Common use of eye preparations, towels, handkerchief, etc. should be avoided.
iv. Maintaining personal hygiene.
v. Surgical correction to prevent blindness.
vi. Attempts should be made to remove poverty and malnutrition, overcrowding, etc.
vii. Health education in order to educate the people about use of antibiotics and importance of personal hygiene.

☞ **Role of Pharmacist in Prevention of Trachoma:**

The pharmacist can play an important role to prevent trachoma by guiding following measures to the public:

(i) Avoiding direct or indirect contact with ocular discharges of infected persons.
(ii) Avoid infected person to enter into the swimming pool.
(iii) Control of flies.
(iv) Personal hygiene, overcrowding should be avoided.
(v) Common use of towels, handkerchief should be avoided.
(vi) Health education to the people about use of medicines and importance of personal hygiene.

27. Tetanus (W. 22, S. 24)

- Tetanus or lockjaw is an acute disease which is distributed throughout the world.
- It is an acute disease induced by exotoxin of the infective organism.
- Tetanus is more prevalent in rural areas than in urban areas.
- Neonatal tetanus is a major cause of infant mortality in India.
- Neonatal tetanus can be prevented by giving every pregnant woman two doses of tetanus toxoid and maintaining sterile conditions during child birth.

☞ Causative Agent of Tetanus:

Tetanus is caused by the exotoxin produced by *Clostridium tetani.* It is a Gram-positive spore bearing bacteria which is present in the faeces of man and animal.

☞ Incubation Period:

Incubation period varies from 3 to 21 days.

☞ Signs and Symptoms of Tetanus (Clinical Features):

- The first symptoms of tetanus usually appear from 3 days to 3 weeks, after the micro-organisms enter the body through the wound.
- Irritability restlessness.
- Headache, fever.
- Neck becomes stiff.
- Difficulty in chewing and swallowing.
- Spasms of muscles of the jaw and face take place and thus 'Lock jaw' occurs.
- The temperature may rise even up to 105°F.
- Severe pain.
- Mortality rate tends to be high varying from 40 to 80%.

☞ Modes of Transmission/Spread of Tetanus:

- It is always transmitted through injury and abrasion from where the contaminated matter with tetanus spores enter into the body.
- The road side injuries and injuries caused by iron articles are the major causes of tetanus.
- Other causes include pin prick, abrasion, wounds, burns, human bite, animal bite, use of unsterile injectable needles and syringes as well as surgical instruments.

- Tetanus may also be caused when spores are introduced through surgical catgut, dressings and various powders such as talcum and sulphonamides, etc.
- Tetanus may result from surgery, called postoperative tetanus.

☞ Prevention and Control Measures of Tetanus:

- Tetanus can be prevented by giving active immunization with tetanus toxoid.
- Infants and children are best immunized giving DPT.
- Pregnant women should be given tetanus toxoid doses as a routine to prevent neonatal tetanus.
- Complete sterility precaution should be taken during child birth.
- All wounds should be thoroughly cleaned and long-acting penicillin should be administered to stop further production of toxin.
- The patient should be given muscle relaxant and sedatives.
- The patient should be kept in a dark and calm room free from noise.
- The patient with a wound should be immediately given an injection of ATS or human tetanus immunoglobulin.

☞ Role of Pharmacist in Prevention of Tetanus:

The pharmacist can guide the public in the prevention of tetanus in the following ways:

(i) Active immunization with tetanus toxoid.
(ii) DPT vaccination to infants and children.
(iii) Cares to be taken while handling the instruments.
(iv) Proper sterility precautions to be taken.
(v) Making the drugs available to the public.
(vi) Can work for exercising first aid to the patients.

28. Leprosy/Hansen's disease (S. 22, 24)

- Leprosy is a chronic, communicable disease.
- The leprosy mainly affects the skin, peripheral nerves, muscles, bones, eyes, testes, nasal mucosa and internal organs.
- The disease occurs in two polar forms: Lepromatous leprosy and tuberculoid leprosy.
- Leprosy is classified in two varieties:
  (i) **Non-infective:** It is generally known as neural or nonlepromatus. It may be of two types:
    (a) Leprosy with patches on the skin.
    (b) Leprosy without patches on the skin.

(ii) **Infective:** It is known as 'Lepromatus leprosy'. The patient suffering from infective leprosy sheds germs from nose, throat and skin.

☞ **Incubation Period:** Six months to 8 years.

☞ **Causative Agent:**

Leprosy is caused by *'Mycobacterium leprae'*, which is an acid-fast bacillus. It was first discovered by a leprologist of Norway named Armauer Hansen in the year 1675, hence named 'Hansen's disease'.

☞ **Signs and Symptoms/Clinical Features of Leprosy:**

- An appearance of small patch on skin.
- Less sensation surrounding area of skin.
- The skin becomes thick, wrinkled.
- Ears are swollen.
- Nasal and throat discharges contain lepra bacilli which are even passed in urine and faeces.
- Deformities of hands and feet.
- Fingers and toes become bent, ulcerated or drops and disappear altogether.
- The patient is thus progressively disfigured and crippled.
- Hypopigmented patches on the skin.
- Partial or total loss of cutaneous sensation in the affected areas.
- Presence of thickened nerves.
- Presence of acid-fast bacilli in the skin and nasal smears.
- Loss of fingers and toes.
- Foot-drops, claw toes and other deformities.

☞ **Prevention and Control Measures of Leprosy:**

1. Early case detection and notification of leprosy cases.
2. Isolation of lepromatous patients in their homes, hospitals or institutions.
3. Infants should be separated at birth from lepromatous parents.
4. Leprosy patient should not be allowed to roam in the streets, bazars or gathering public places.
5. Discharges, clothes, utensils, etc. of the patient should be destroyed or thoroughly disinfected.
6. **Surveillance:** Clinical and bacteriological survey of the cases should be done.
7. **Vaccination:** BCG vaccination can be done as a protection.

8. **Chemophylaxis:** Chemotherapeutic agent like dapsone at the dose of 1–4 mg/kg week gives a reasonable protection in children.
9. **Multi-drug therapy:** Leprosy should be treated with multi-drug therapy. A combination of rifampicin, dapsone, and clofazimine is recommended.
10. **Rehabilitation:** It is an integral part of leprosy control. Rehabilitation measures are medical, surgical, social, educational and vocational—consistently over years with sustained counselling and health education.
11. **Health education:** It includes the education to the patient, his/her family as well as general public about the personal hygiene, precautions to be taken regarding spread of disease, signs and symptoms and drug therapy.
12. Social support which helps in prevention and control of leprosy includes:
    - Assistance for travel from to and from clinic.
    - Help to needy families in terms of food and clothes.
    - Care of children and their education.
    - Programmes like slum improvement.
    - The National Leprosy Eradication Programme (NLEP)

☞ Role of Pharmacist in Prevention of Leprosy:

The pharmacist can create an awareness in the people regarding mode of spread, signs and symptoms and precautions to be taken in the prevention of leprosy which are as follows:

1. Personal hygiene
2. Avoid overcrowding, poor housing
3. Health education
4. Making the drugs available in the treatment of leprosy, e.g. DDS (dapsone)
5. Involvement in the National Leprosy Eradication Programme.
6. Suggestion to the infected patients regarding isolation, rehabilitation as per the stage of disease.
7. Support in clinical and bacteriological surveillance.
8. Disinfection of clothes, utensils, discharges of the patient.
9. Early detection and notification.

29. Sexually Transmitted Diseases (STDs)

- STDs are a group of communicable diseases which are transmitted by sexual contact and are caused by a wide range of bacterial viral, protozoal and fungal agents.
- These are also known as veneral diseases (VD)
  - Examples of STDs are:
    – Syphilis
    – Chancroid
    – Gonorrhoea
    – Lymphogranuloma venereum
    – AIDS
    – Genital herpes
    – Donovanosis
    – Vaginitis

☞ Classification of Agents Causing STDs:

(a) Bacterial agents, e.g. *Neisseria gonorrhoeae, Chlamydia trachomatis, Treponema pallidum, Shigella*.
(b) Viral agents, e.g. Human (α) herpes virus 1 and 2.
Human (β) herpes virus 5, hepatitis β virus.
Human immunodeficiency virus
(c) Protozoal agents, e.g. *Entamoeba histolytica, Giardia lamblia, Trichomanas vaginalis*
(d) Fungal agents, e.g. *Candida albicans*
(e) Ectoparasites, e.g. *Phthirus pubis, Sarcoptes scabiei.*

☞ Modes of Transmission of STDs:

1. STDs spread predominantly by sexual contact including vaginal, anal and oral sex.
2. STDs can also spread by means such as via blood and blood products.
3. Sex with multiple partners.
4. Sex without use of condoms.
5. Sharing needles while injecting drugs.
6. Sharing razors during shaving.
7. Prostitution.

☞ Prevention and Control Measures of STDs:

1. Use of latex condoms during sex.
2. Avoiding sex with multiple partners.
3. Use of sterile syringe and needles during blood/IV transfusions.

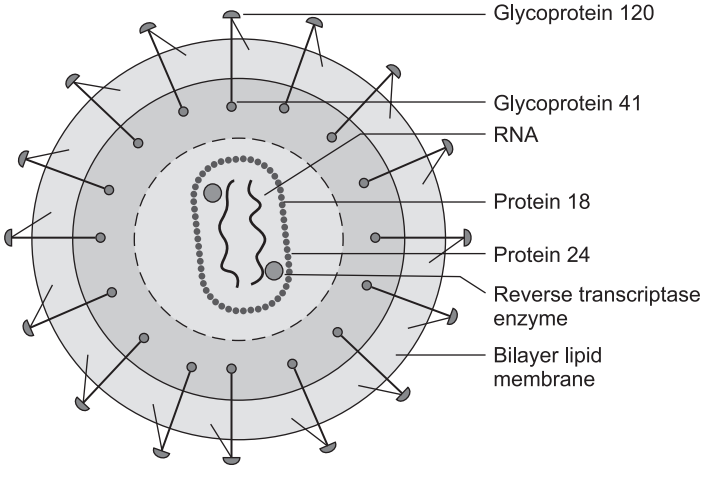
4. Avoid the used of infected blood.
5. Maintain sterility during surgical operations.
6. Avoiding use of common shaving razors/blades.
7. Health education to the public about STD.
8. Avoid going to prostitutes for sexual intercourse.
9. Avoid pregnancies of woman who are infected with STDs.
10. Avoid blood donation from a person who is infected with STD.
11. Prostitutes should be medically examined from time to time for the absence of STD.
12. Overall living conditions should be improved.

30. AIDS (S. 22, 24, W. 22, 23)

- AIDS stands for acquired immunodeficiency syndrome which is a very fatal disease.
- Sometimes it is also termed slim disease.
- It is caused by a virus known as human immunodeficiency virus (HIV).
- HIV attacks the white blood cells which serve the body's defence system against infections. Once these cells are infected with HIV, this defence system gets weakened, exposing the body increasingly, to infections that ultimately prove fatal.
- HIV invades the T4 lymphocytes, where it multiplies.

☞ Causative Agent:

AIDS is caused by a virus known as acquired immunodeficiency virus (HIV) which is an RNA virus. It is a retrovirus that contains the enzyme reverse transcriptase.



AIDS virus/HIV

☞ Incubation Period:

Incubation period of AIDS is 10 years.

☞ Signs and Symptoms (Clinical Features) of AIDS:

Signs and symptoms of AIDS include:

(i) Weight loss.
(ii) Fever or night sweating for longer than one month (intermittent constant).
(iii) Chronic diarrhoea which persists for more than one month.
(iv) Swelling in the groins.
(v) Purple spots on the skin.
(vi) Persistent cough and shortness of breath.

☞ Mode of Spread/Transmission of AIDS:

HIV virus is transmitted from one person to another by following methods:

(i) Sexual contact, i.e. vaginal, oral or anal sex can spread AIDS as the virus is excreted in the semen or vaginal secretions.
(ii) Through transfusion of blood infected with AIDS virus.
(iii) Through contaminated needles and syringes.
(iv) It is transmitted from infected mother to the foetus through placenta.

☞ AIDS does not Spread

(i) Through shaking hands.
(ii) Through causal social contact with the patient.
(iii) By playing with infected person.
(iv) By sharing food, towels, clothes and toilets.
(v) Through mosquito or other insect bites.

☞ Prevention and Control Measures of AIDS:

The following measures should be adopted for the prevention and control of AIDS:

(i) Have only one uninfected sexual partner and do not indulge in multiple sexual partners.
(ii) Avoid going to prostitutes for sexual intercourse.
(iii) Do not indulge in oral/anal sex.
(iv) Use condom during sexual intercourse.
(v) Properly sterilise the needles and syringes. Preferably use disposable needles and syringes.

(vi) Women suffering from AIDS or who are at high risk of infection should avoid becoming pregnant because infection can be transmitted from infected mother to unborn or newly born child.

(vii) Blood and blood products should be thoroughly investigated for the absence of HIV infection.

(viii) Avoid blood donation from strangers and professional donors.

(ix) Hair cutting saloons should ensure that barber's razor is properly cleaned.

(x) Piercing of nose, ear lobes or tattooing carry a risk of HIV transmission, therefore, instruments used for this purpose should be thoroughly sterilized.

(xi) Impart health education to the public to enable them to make life-saving choices (e.g. avoiding indiscriminate sex, using condom, etc.).

☞ Role of Pharmacist in Prevention of AIDS:

The pharmacist can play an important role in prevention of AIDS by the following ways:

1. **Education:**
   - Educate the people to avoid unsafe sex.
   - Use of condom is suggested.
   - Do not share the syringe, needles and razors.
   - Women suffering AIDS should avoid pregnancy.
   - He can distribute the educational materials and guidelines to the public.
2. **Prevention of blood-borne HIV transmission:**

   The blood of donor must be checked for HIV_1 and HIV_2 before donation. Strict sterilization practices should be preferred.
3. **Antiretroviral treatment:**

   Pharmacist should make these drugs available to the patient at ease and shall counsel for the betterment, e.g. zidovudine, didanosine, stavudine, lamivudine, indinavir, nevirapine, delaviridine.

4. Pharmacist should guide the people about availability of primary healthcare facilities including mother and child health, family planning and education.
5. Pharmacist should involves in AIDS eradication programmes, rally, etc.
6. Pharmacist can make the availability of contraceptives such as condoms and self-service counters for ease to the customers.

31. Syphilis

- *Causative agent*: Syphilis is a chronic sexually transmitted infection caused by *Treponema pallidum.*
- *Incubation period*: 9 months.
- *Mode of transmission*
  - i. By direct sexual contact.
  - ii. Through the placenta infected mothers to its foetus.
  - iii. Through infected towels, kissing, etc.
- *Prevention and control*
  - i. Avoid sex with multiple partners and prostitutes.
  - ii. Detection of positive cases and their thorough treatments.
  - iii. Use of condoms to avoid further spread and prevention.
  - iv. Health education to public about STD and its problems.

32. Gonorrhoea

- *Causative agent*: Gonorrhoea is a sexually transmitted disease caused by Gram-negative bacteria *Neisseria gonorrhoeae*.
- *Mode of transmission*
  - i. By direct sexual contact.
  - ii. Through blood transfusion, infected needles and syringes.
  - iii. To certain it may spread indirectly through infected towels, bed sheets, clothes, etc. but it is rare since the germs die readily outside the body.
- *Prevention and control*
  - i. By avoiding sex with multiple partners and prostitutes.
  - ii. Use of condoms during intercourse.
  - iii. If a positive case is detected, it should be treated thoroughly.
  - iv. Health education to the public about STDs and its problems.

OBJECTIVE QUESTIONS WITH ANSWERS IN BOLD LETTERS

1. **Nosocomial infection** is an infection appearing in a patient when he or she visited the hospital or other healthcare facility.
2. COVID-19 was first identified in **Wuhan** district of China in December 2019.
3. Malaria spreads by bite of **female Anopheles mosquito**.
4. Avian flu is normally known as **"Bird Flu"**.
5. AIDS and COVID-19 are **pandemic diseases**.
6. **Microbiology** is the study of all living organisms that are excessively small to be visible with the bare eye.
7. Scabies is a **contagious disease**.
8. Ziehl-Neelsen acid fast staining is used for separation of **mycobacteria** group of members form others.
9. Trachoma is an infectious disease caused by bacterium ***Chlamydia trachomatis***.
10. **Botulism** is a fatal form of food poisoning.
11. Incubation period of dengue is **4 to 10 days**.
12. SARS and MARS are **respiratory infections**.
13. The diseases that spread from one person to another are called **communicable diseases**.
14. **COVID 19** is viral disease.
15. **Quarantine** is a restriction on the movement of people, animal and goods which are intended to prevent the spread of disease.
16. Hepatitis is a systemic infection of **liver**.
17. **Louis Pasteur** is the Father of Microbiology.
18. Dengue is also called **break bone fever**.
19. **Outbreak** is a sudden increase in occurrence of a disease than normal.
20. Trachoma is a serious and contagious disease that affects the **eye.**
21. The full form of SARS: **severe acute respiratory syndrome**.
22. Leprosy is also known as **Hansen's disease**.
23. Hospital acquired infections are also known as **nosocomial infections**.
24. The causative agent of chickenpox is **varicella-zoster virus**.
25. Whooping cough is caused by ***Bordetella pertussis***.
26. Malaria is caused by **plasmodium**.

27. Pneumonia is commonly infection of **lungs**.
28. Trichomoniasis is caused by infection with a **protozoan parasite**.
29. Cancer cells are **Hela cells**.
30. **Epidemiology** is a medical science that involves the study of the incidence and distribution of diseases in large population.
31. The causative agent for tuberculosis is ***Mycobacterium tuberculosis***.
32. Dengue is example of **arthropod borne diseases**.
33. Dehydration is the main risk of **gastrointestinal infections**.
34. **Arthropod borne infections** are caused by the bite of infected mosquitoes and ticks.
35. Filariasis also known as **filarial elephantiasis**.
36. Tetanus is an infectious disease caused by bacterium ***Clostridium tetani***.
37. STD may also be called **venereal diseases**.
38. **Lock jaw** is another name of tetanus.
39. Trachoma and tetanus are **surface infections**.
40. Chikunguniya is a viral infection transmitted by **mosquito**.

Chapter
5

Introduction to Healthcare Systems and National Health Programmes

1 What is meant by Health System/Healthcare System? Give the objectives of Healthcare System. Mention major components of it.

☞ **Healthcare System:**

It is the organization of people, institutions and resources that deliver healthcare services to meet the health needs of the target population.

☞ **Objectives/Goals of Healthcare System:**

1. To ensure adequate qualitative, preventive and curative healthcare to the people of state or nation.
2. To provide affordable quality healthcare to the people through all the systems of medicines.
3. To facilitate in prevention, treatment of public health emergencies due to biological, chemical, radiological and nuclear hazards in disaster situations.
4. To promote healthy living and to facilitate prevention, early detection and management of non-communicable diseases.
5. The goal of a healthcare system is to enhance the health of the population in most effective manner in light of the society's available resources and competing needs.

☞ **The Major Components of Healthcare System:**

1. Health promotion.
2. Primary healthcare.
3. Specialist services.
4. Hospitals.

2 What are National Health Programmes? Give its objectives. (S. 22)

☞ National Health Programmes (NHPs)

"The Union Ministry of Health and Family Welfare implements various programmes on a national scale in the areas of health, prevention and control of major communicable diseases and promotional of traditional and indigenous and newer systems of medicines are called National Health Programmes".

☞ Objectives of National Health Programmes (NHPs)

1. To reduce infant mortality and maternal mortality.
2. To prevent and control communicable and non-communicable diseases.
3. To improve environmental sanitation.
4. To raise standard of nutrition.
5. To control population.
6. To improve rural health.
7. To improve efficiency of health education and health promotion programmes.
8. To create the conditions and developing personal motivation, knowledge and skill to choose healthy lifestyle.
9. Access to integrated comprehensive primary healthcare.
10. Universal access to public health services such as women's health, child health, drinking water, sanitation and hygiene.
11. To promote healthy lifestyles.

3 Enlist/Give/Mention/State the main activities conducted under National Health Programmes (NHP). (S. 22)

☞ The main activities under National Health Programmes are:

- Promoting physical activity among the general population.
- Promoting healthy diet and improving food quality.
- Reducing tobacco smoking.
- Reducing alcohol consumption, changing alcohol consumption patterns, and reducing alcohol abuse-related health damage.
- Reducing abuse of other psychoactive substances and drug abuse-related health damage.

- Improving efficiency of health education and health promotion programmes.
- Promoting mental health and preventing mental disorders.
- Reducing exposure to harmful factors in the living, working and educational environment and mitigating their health effects.
- Improving sanitation throughout the country.
- Reducing the incidence of accidents, and traffic accidents, in particular.
- Improving efficiency and effectiveness of emergency services in life-threatening conditions, access to and efficiency of primary healthcare.
- Preventing premature births, low birth weight and reducing related health effects.
- Improving early diagnosis and active care of persons at risk of ischaemic heart disease; and treatment of breast and cervical cancers.
- Providing better opportunities for people with disabilities and developing their capacities to lead active lives.
- Improving prevention of communicable diseases, dental caries and periodontal disease in children, adolescents and pregnant women.

4 State/Enlist various ongoing National Health Programmes implemented by Director General of Health Services (DGHS). (S. 22, 24, W. 22, 23)

☞ The ongoing National Health Programmes implemented by DGHS/Government of India are:

1. National Iodine Deficiency Disorders Control Programme.
2. National Leprosy Eradication Programme.
3. National Mental Health Programme.
4. National Programme for Palliative Care.
5. National Oral Health Programme.
6. National Organ Transplant Programme.
7. National Programme for Control of Blindness and Visual Impairment
8. National Programme for Prevention and Control of Fluorosis.
9. National Tobacco Control Programme.
10. Revised National Tuberculosis Control Programme.

11. National Programme on Healthcare for Elderly.
12. National Programme for Prevention and Control of Deafness.
13. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke.
14. National Vector-Borne Disease Control Programme:
    i. Guinea Worm Eradication Programme (GWEP).
    ii. Programme for Prevention and Control of Leptospirosis.
    iii. National Rabies Control Programme.
    iv. National Viral Hepatitis Surveillance Programme.
    v. Chikungunya
    vi. Malaria
    vii. Lymphatic filariasis
    viii. Kala-azar
    ix. Japanese encephalitis (JE)
    x. Dengue/ Dengue hemorrhagic fever (DF/DHF)
15. National Programme for Prevention and Management of Trauma and Burn Injuries.
16. Health Programmes Monitored by National Centre for Disease Control (NCDC).
    i. Antimicrobial Resistance (AMR) Containment.
    ii. National Programme on Climate Change and Human Health (NPCCHH).
    iii. Integrated Disease Surveillance Programme (IDSP).
    iv. Inter-Sectoral co-ordination for Prevention and Control of Zoonotic Diseases.
    v. Yaws Eradication Programme (VEP).

5 Give the objectives, functioning and outcome of "National Iodine Deficiency Disorders Control Programme" (NIDDCP). (W. 23)

☞ National Iodine Deficiency Disorders Control Programme (NIDDCP):

Objectives:

- Surveys to assess the magnitude of iodine deficiency disorders (IDD) in the districts.
- Supply of iodised salt in place of common salt.

- Surveys to assess iodine deficiency disorders and the impact of iodated salt after every 5 years in the districts.
- Laboratory monitoring of iodated salt and urinary iodine excretion.
- Health education and publicity.

Functioning and Outcome:

- A nodal ministry for implementation of NIDDCP has been created.
- Consumption of iodated salt has increased from 51.1% (2005-2006) to 71.1% in 2009.
- National Reference Laboratory for monitoring IDD, four regional laboratories and 35 state laboratories have been formed.

6 What are the objectives, functioning and outcome of "National Leprosy Eradication Programme" (NLEP).

☞ **National Leprosy Eradication Programme (NLEP) Objectives:**

- To reduce prevalence rate of leprosy less than 1/10,000 population at subnational and district level.
- To reduce grade II disability % <1 among new cases at national level.
- To reduce grade II disability cases <1 case per million population at national level.
- Zero disabilities among new child cases.
- Zero sigma and discrimination against the persons affected by leprosy.

Functioning and Outcome:

- NLEP functions under National Health Mission (NHM).
- Diagnosis and treatment of leprosy.
- Capacity building.
- Information, education and communication (IEC) and counseling.
- Disability prevention and medical rehabilitation.
- NGO services.

7 Give the objectives functioning and outcome of "National Mental Health Programme" (NMHP): (W. 23)

☞ **National Mental Health Programme (NMHP):**

Objectives:

- To ensure the availability and accessibility of minimum mental healthcare for all the foreseeable future.
- To encourage the application of mental health knowledge in general healthcare and social development.
- To promote community participation in the mental health service development.
- To enhance resource in mental health subspecialties.

Functioning and Outcome:

- District Mental Health Programme.
- Public–private partnership (PPP) model activities.
- Mental health helpline.
- Manpower development schemes.
  - Centers of excellence in mental health.
  - Postgraduate (PG) training departments of mental health facilities.
- IEC activities.

8 What is Palliative Care? Give the objectives, functioning and outcome of "National Programme for Palliative Care" (NPPC).

☞ **Palliative Care:**

- Palliative care is specialized medical care for people living with serious illness.
- This type of care is focused on providing relief from the symptoms and stress of illness.
- The goal of this care is to improve quality of life for both the patient and the family.
- Palliative care is provided by a specially-trained team of doctors, nurses and other specialists who work together with a patient's other doctors to provide an extra layer of support.
- Palliative care team focus on quality of life.

- Palliative treatment includes—medication, nutritional changes, relaxation techniques, emotional and spiritual support, for children or family caregivers.

☞ **National Programme for Palliative Care (NPPC):**

Objectives:

- Improve the capacity to provide palliative care service delivery for patients in National Programme for Prevention and Control for Cancer, cardiovascular disease, diabetes, and stroke; national programme for healthcare of elderly; National AIDS Control Programme and National Rural Health Mission.
- Develop national standards for palliative care services.

Functioning and Outcome:

- Provide essential funding to build capacity for non-communicable diseases, cancer, HIV/AIDS and efforts targeting elderly populations.
- Provide funds for establishing state palliative care cell and palliative care services at the district hospitals.

9 What is Oral Health Programme? Give the objectives, functioning and outcome of "National and Health Programme".

☞ **Oral Health Programme:**

- The oral Health Programme promotes oral health activities designed to encourage good oral health practices and increase awareness of the importance of oral health as preventive care.
- The goal of oral health program is to prevent and control oral, craniofacial diseases, conditions and injuries and improves access to preventive services and dental care.
- Oral hygiene is vital to an individual's overall health and well-being.

☞ **National Oral Health Programme (NOHP):**

Objectives:

- To improve the determinants of oral health.
- To reduce morbidity from oral diseases by strengthening oral health services at health facilities located in the districts.

- To integrate oral health promotion and preventive services with general healthcare system and other sectors that influence oral health.
- Integrate promotion of public–private partnership (PPP) for achieving public health goals.

Functioning and outcome:

- To develop a model dental health clinic in each district
- IEC activities.
- Training of nodal medical officer.
- Monitoring, supervision and evaluation.

10 What is National Organ Transplant Programme (NOTP)? Give its objectives, functioning and outcome.

☞ **National Organ Transplant Programme (NOTP):**

- In India, Transplantation of Human Organ Act was passed in 1994.
- This Act provides a system to regulate, removal, storage and transplantation of human organs for therapeutic purposes and for prevention of commercial dealings in human organs.
- Organ transplantation is the life-saving therapy for end-stage organ failure.
- The most commonly transplanted organs are the kidney, liver, heart, lungs, pancrease, intestine, etc.

☞ **National Organ Transplant Programme (NOTP):**

Objectives:

- To organize a system of organ and tissue procurement and distribution for transplantation.
- To promote deceased organ and tissue donation.
- To train required manpower.
- To protect vulnerable poor from organ trafficking.
- To monitor organ and tissue transplant services and bring about policy and programme corrections/changes whenever needed.

Functioning and outcome:

- Establishment of National Organ and Tissue Transplant Organization (NOTTO).
- Establishment of Regional Organ and Tissue Transplant Organization (ROTTO).
- Establishment of State Organ and Tissue Transplant Organization (SOTTO).
- IEC activity.

11 What are the objectives, functioning and outcome of "National Programme for Control of Blindness and Visual impairment" (NPCBVI).

☞ **National Programme for Control of Blindness and Visual Impairment (NPCBVI):**

Objectives:

- To reduce the backlog of avoidable blindness.
- Develop and strengthen the strategy of "Eye Health for All" and prevention of visual impairment.
- Strengthening and upgradation of regional institutes of ophthalmology (RIOs) and other partners like medical colleges, district hospitals, vision centres, NGO eye hospitals.
- Strengthening the infrastructure for providing high quality comprehensive eye care in all districts.
- To enhance community awareness on eye care and lay stress on preventive measures.
- Increase and expand research for prevention of blindness and visual impairment.
- To secure participation of voluntary organizations/private practitioners in delivering eye care.

Functioning and Outcome:

- Developing multi-purpose district mobile ophthalmic units in district hospitals.
- Provision for distribution of free spectacles to old needy persons.
- Emphasis on comprehensive eye care coverage.
- Strengthening of tertiary eye care centers.

12 What is National Programme for Prevention and Control of Fluorosis (NPPCF)? Give its objectives, functioning and outcomes.

- Fluorosis is a public health problem caused by excess intake of fluoride through drinking water/food products/industrial pollutions over a long period.
- Fluorosis results in major health disorders like:
  i. Dental fluorosis.
  ii. Skeletal.
  iii. Non-skeletal florosis.
- Dental fluorosis affects the children and results in discoloration and disfiguring of teeth.
- Skeletal fluorosis affects bones and major joints of the body like neck, backbone, shoulder, hip and knee joint with severe pain, rigidity or stiffness in joints.
- Non-skeletal fluorosis is seen in the form of gastrointestinal complaints.

☞ National Programme for Prevention and Control of Fluorosis (NPPCF):

Objectives:

- Assess and use the baseline survey data of fluorosis of ministry of drinking water and sanitation.
- Comprehensive management of fluorosis in the selected areas.
- Capacity building for prevention, diagnosis and management of fluorosis cases.

Functioning and Outcome:

- Surveillance of fluorosis in the country.
- Capacity building in the form of training and manpower support.
- Establishment of diagnostic facilities in medical hospitals.
- Management of fluorosis cases including treatment, surgery, rehabilitation, etc.
- Health education for prevention and control of fluorosis cases.

13 What is National Tobacco Control Programme (NTCP). Give its objectives, functioning and outcome.

☞ **National Tobacco Control Programme (NTCP):**

- Government of India Launched the National Tobacco Control Programme (NTCP) in the year 2007–08.
- The aim of this programme is to create awareness about the harmful effects of tobacco consumption to reduce production and supply of tobacco products.

☞ **National Tobacco Control Programme (NTCP):**

Objectives:

- To bring about greater awareness about the harmful effects of tobacco use and about the tobacco control laws.
- To facilitate effective implementation of the tobacco control laws.

Functioning and Outcome:

- Training of health and social workers, NGOs, school teachers, enforcement officers, etc.
- Information, education and communication (IEC) activities.
- School programmes.
- Monitoring tobacco control laws.
- Co-ordination with Panchayati Raj institutions for village level activities.
- Setting-up and strengthening of cessation facilities including provision of pharmacological treatment facilities at district level.

14 Give the objectives, functioning and outcome of "Revised National Tuberculosis Control Programme (RNTCP)".

☞ **Revised National Tuberculosis Control Programme:**

Objectives:

Vision: TB-free India with zero deaths, disease and poverty due to tuberculosis.

Goal: To achieve a rapid decline in burden of TB, morbidity and mortality while working towards elimination of TB in India by 2025.

Functioning and Outcome:

For achieving the goals of the NSP 2017–2025, the following critical components of the programme will be addressed on priority.

- Ministry of Health and Family Welfare (MoHFW) will evolve a scheme to address the patients seeking care in private sector. The scheme will have suitable incentives for the private doctors and patients to report TB cases coupled with another scheme to provide free of cost medicines to TB patients going to a private doctor/institute.
- A robust, modern management and information service (MIS) system will be developed to monitor the newly diagnosed as well as existing cases of TB on delivery of the drug kit to the patient, compliance to treatment regimen, etc. The MIS system will have suitable linkages with the private pharmacy on sale of anti-TB drugs thereby integrating those patients into the MIS.
- The availability of rapid molecular tests will be suitably augmented so that these diagnostic facilities are also made available for patients referred by any private doctor or institute.
- To improve the compliance of the TB patients to the treatment regimen, MoHFW will start customized SMS services to the individual patients on regular basis reminding them about the time to consume the drugs.
- The MoHFW will establish mechanisms for facilitating nutritional support to the TB patients, including financial support through DBT mode.
- The MoHFW will work on a scheme to provide suitable incentives to the states doing well in RNTCP. The incentives will also be linked with performance in "Swachh Bharat Mission".
- TB Corpus Fund: To improve financial sustainability in the TB sector the programme will mobilize additional resources to accelerate TB control efforts, for which the 'Bharat Kshay Niyantran Pratishthan' (India TB Control Foundation) is proposed. Activities like nutrition support for TB patients, active case finding in prisons, slums, tribal area, sputum collection and transport in difficult areas will be carried out.

15 Give the objectives, functioning and outcome of "National Programme of Healthcare for Elderly (NPHCE)".

☞ **National Programme of Healthcare for Elderly (NPHCE):**

Objectives:

- To provide accessible, affordable and high-quality long-term, comprehensive and dedicated care services to an ageing population.
- Creating a new architecture for ageing; to build a framework to create an enabling environment for a society for all ages.
- To promote the concept of "Active and Healthy Ageing".
- Convergence with NRHM, AYUSH and other departments like Ministry of Social Justice and Empowerment.

Functioning and Outcome:

- Setting up district geriatric units with dedicated geriatric OPD.
- Setting up of biweekly geriatric clinics and rehabilitation units in all community health centers and primary health centers.
- Strengthening all subcenters to provide with equipment for community outreach services.
- Provide training to staff of public healthcare system in geriatric care. Integration with NRHM.

16 What are the objectives, functions and outcome of "National Programme for Prevention and Control of Deafness (NPPCD)".

☞ **National Programme for Prevention and Control of Deafness (NPPCD):**

Objectives:

- To prevent avoidable hearing loss on account of disease or injury.
- Early identification, diagnosis and treatment of ear problems responsible for hearing loss and deafness.
- To medically rehabilitate persons of all age groups, suffering with deafness.
- To strengthen the existing intersectoral linkages for continuity of the rehabilitation programme, for persons with deafness.
- To develop institutional capacity for ear care services by providing support for equipment material and training personnel.

Functioning and Outcome:

- To strengthen the service delivery for ear care.
- To develop human resource for ear care services.
- To promote public awareness through appropriate and effective IEC strategies with special emphasis on prevention of deafness.
- To develop institutional capacity of the district hospitals, community health centers and primary health centers.

17 Give the objectives, functioning and outcome of "National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Strokes (NPPCCDCDS)". (S. 23)

☞ **National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPPCCDCDS):**

Objectives:

- Health promotion through behaviour change with involvement of community, civil society, and community-based organizations, media, etc.
- Screening at all levels in the healthcare delivery system from subcentre and above for early detection of the covered diseases.
- To build capacity at various levels of healthcare for prevention, early diagnosis, treatment rehabilitation, IEC/BCC, operational research and rehabilitation.
- To provide logistic support for diagnosis and cost effective treatment at primary, secondary and tertiary levels of healthcare.
- To support for development of database of NCDs through surveillance system and to monitor NCD morbidity and mortality and risk factors.

Functioning and Outcome:

- Health promotion awareness generation and promotion of healthy lifestyle.
- Screening and early detection.
- Timely affordable and accurate diagnosis.
- Access to affordable treatment.
- Rehabilitation.

18 Give the objectives, functioning and outcome of "Programme for Prevention and Control of Leptospirosis" (PPCL).

☞ Programme for Prevention and Control of Leptospirosis (PPCL):

Objective:

- To reduce morbidity and mortality due to leptospirosis in humans.

Functioning and outcome:

- Development of trained manpower.
- Strengthening the surveillance of leptospirosis in humans.
- Strengthen diagnostic laboratories in programmed states.
- Create awareness regarding timely detection and appropriate treatment of patients.
- Advocacy for strengthening of patient management facilities in programmed states.
- Strengthening intersectoral co-ordination at state and district level for outbreak detection, prevention and control of leptospirosis.

19 What are the objectives, functioning and outcome of "National Rabies Control Programme (NRCP)".

☞ National Rabies Control Programme (NRCP):

Objectives:

- Training of healthcare professionals on appropriate animal bite management and rabies postexposure prophylaxis.
- Advocacy for states to adopt and implement interdermal route of postexposure prophylaxis for animal bite victims and postexposure prophylaxis for high-risk categories.
- Strengthen human rabies surveillance system.
- Strengthening of regional laboratories under NRCP for rabies diagnosis.
- Creating awareness in the community through advocacy, communication and social mobilization.

Functioning and Outcome:

- Training and capacity building.
- Guidelines and technical support to states.
- Rabies and animal bite surveillance.
- Laboratory strengthening for rabies diagnosis.
- IEC activities.
- Intersectoral co-ordination for rabies control.
- Operational research.

20 Give the objectives of "National Viral Hepatitis Surveillance Programme" (NVHSP).

☞ **National Viral Hepatitis Surveillance Programme (NVHSP):**

Objectives:

- To establish laboratory network for laboratory-based surveillance of viral hepatitis in different geographical locations of India.
- To ascertain the prevalence of different types of viral hepatitis in different zones of the country.
- To provide laboratory support for outbreak investigation of hepatitis through established network of laboratories.
- To develop technical material for generating awareness among healthcare providers and in the community about water-borne and blood-borne hepatitis.

Functioning and Outcome:

- Establishment of laboratory based surveillance for hepatitis in the country for collection of data, development of testing and surveillance guidelines and its dissemination.
- A network of laboratories with quality testing for hepatitis markers.
- Training of manpower/healthcare providers in 10 regional laboratories.
- Development of IEC for providers and community.
- Establishment of baseline data for hepatitis to see the impact.
- Pharmacists have a role in disaster management.

21 Give the objectives, functioning and outcome for prevention and control of chikungunya.

☞ **Objectives:**

i. To prevent mortality due to dengue.

ii. To reduce morbidity due to dengue.

Functioning and Outcome:

The NVBDCP strategies comprise:

- Early case diagnosis, prompt and complete treatment; integrated vector management including promotion of personal protective measures like insecticide treated bed nets.
- Biological control measures like larvivorous fish; behaviour change communication.
- Capacity building through integrated training at all tiers of healthcare service delivery system, monitoring and evaluation.
- Partnership with other national health programs, non-health sector departments, civil society organizations (NGOs/faith-based organizations/community-based organizations/self-help groups/Panchayati Raj institutions), corporate sector, medical colleges and professional bodies are also integral part of the programme.
- The objective of the partnership is to provide uniformity in diagnosis, treatment and monitoring through a wider base to maximize access to treatment and improve acceptability of appropriate and locally suitable vector control measures.
- Under this programme, the central government provides technical support as well as logistics. The state governments ensure implementation of the programme.

22 Give the objectives, functioning and outcome of the prevention and control of following diseases.

(a) Malaria

(b) Lymphatic filariasis

(c) Kala-azar

(d) Japanese encephalitis (JE)

(e) Dengue fever/dengue haemorrhagic fever (DF/DHF).

☞ (a) Malaria:

Functioning and Outcome:

Surveillance and case management:

- Early case detection (passive and active).
- Complete treatment.
- Sentinel surveillance.

Integrated vector management (IVM):

- Indoor residual spray (IRS).
- Insecticide-treated bed nets (ITNs)/long-lasting insecticide-treated nets (LLINs).
- Antilarval measures including source reduction.

Epidemic Preparedness and Early Response

Supportive interventions:

- Capacity building.
- Behaviour change communication (BCC).
- Intersectoral communication.
- Monitoring and evaluation (M & E).
- Operational research and applied field research.

☞ (b) Lymphatic Filariasis:

Functioning and Outcome:

The National Filaria Control Programme (NFCP) has following strategies for implementation:

- Detection and treatment to the patients with anti-filarial drug.
- Anti-larval work in urban areas covered under NFCP.
- Mass drug administration (MDA) with antifilarial drugs like diethylcarbamazine (DEC) and albendazole to the eligible population living at the risk of filariasis and identifying people with chronic manifestations of the disease like lymphoedema and hydrocele is suggested.

☞ (c) Kala-azar:

Functioning and Outcome:

The kala-azar elimination programme has following strategic components:

- Case detection and treatment.
- Interruption of transmission through vector control.

- Intersectoral convergence.
- Diagnosis and treatment.

Drugs for kala-azar are as follows:

- Single dose liposomal amphotericin B (LAMB).
- Miltefosine.
- Amphotericin B emulsion.
- Amphotericin B deoxycholate in multiple doses.
- Combination treatment (e.g. miltefosine and paromomycin).

☞ (d) Japanese Encephalitis (JE):

Functioning and Outcome:

The programme on JE has following strategies:

- Early diagnosis and case management.
- Vaccination of children between 1 and 15 years of age.

Prevention and Control Measures:

- Protection against mosquito bites using insecticide treated mosquito nets.
- JE vaccine is available. Three doses of the vaccine provide immunity lasting for few years.
- Vaccination is not recommended as an outbreak control measure. It takes at least one month after second dose to develop antibodies.
- Clinical management involves maintaining fluid and electrolyte balance and control of convulsions. There is no specific treatment.
- Piggeries should be kept away (4–5 km) from human dwellings.
- Domestic pigs and wild birds are carriers of JE virus.
- Rice field breeding mosquitoes (*Culex tritaeniorhynchus* group) infected with JE virus (a flavi virus) is responsible for the infection.

☞ (e) Dengue Fever/Dengue Hemorrhagic Fever (DF/DHF):

Functioning and Outcome:

Government of India has taken various steps for prevention and control of the disease as indicated are as follows:

- National guidelines for clinical management of dengue fever, dengue hemmorrhagic fever, dengue shock syndrome have been developed and circulated to hospitals in all states.

- 110 sentinel surveillance hospitals with adequate laboratory support for diagnosis of dengue and 13 referral Apex laboratories with advanced diagnostic facilities have been established.
- To maintain uniformity and standard of diagnostics, ELISA test kits are provided centrally and the cost is borne by the government.
- Diagnosis of the disease is provided free of cost to the patients.

23 What do you mean by trauma and burn injuries? Give the objectives, functioning and outcome of "National Programme for Prevention and Management of Trauma and Burn Injuries (NPPMTBI)".

☞ **Trauma:**

Trauma is an emotional response to a terrible event like an accident, rape or natural disaster. Psychological trauma is a response to an event that a person finds highly stressful.

Burn Injuries:

Burn injuries are the damage to skin or deeper tissues caused by sun, hot liquids, fire, electricity or chemicals. The degree of severity of most of burns is based on the size and depth of the burn.

National Programme for Prevention and Management of Trauma and Burn Injuries (NPPMTBI)

Component I: Trauma

Objectives:

- To establish a network of trauma care facilities to reduce the incidence of preventable deaths due to traffic accidents by observing golden hour principle.
- To develop proper referral and communication network between ambulances and trauma centers and within the trauma centers.
- To develop National Injury Surveillance, Trauma Registry and Capacity Building Center for collection, compilation, analysis and dissemination of information for policy formation and preventive interventions.

- To develop trauma registry centers for ensuring delivery of quality services.
- To develop a National Trauma System Plan.
- To improve awareness through IEC activities.

Functioning and Outcome:

- Infrastructure strengthening.
- National Injury Surveillance, Trauma Registry and Capacity Building Center established.
- IEC activities initiated.

Component II: Burn Injuries

Objectives:

- To establish a network of burn units with adequate infrastructural facility for burn management and rehabilitation in all identified government medical colleges and district hospitals.
- To improve awareness among general masses and vulnerable groups especially women, children, industrial and hazardous occupational workers.
- To establish burn data registry under NPPMBI with integration with National Injury Surveillance Center for collection, compilation and analysis of burn injury data to bring down the incidence of burn injury cases.
- To carry out research for assessing behavioural, social and other determinants of burn injuries in the country to facilitate effective need based programme planning monitoring and evaluation.
- To organize burn injury training programmes for doctors, nurses and paramedical staff associated in management of burn injuries from the identified district hospitals and government medical colleges.

Functioning and Outcome:

- Prevention programme (IEC)
- Treatment
- Rehabilitation
- Training
- Monitoring and evaluation
- Research

24 Write a note on "Health Programmes Monitored by National Centre for Disease Control" (NCDC).

☞ Health Programmes Monitored by National Centre for Disease Control (NCDC)

(a) Antimicrobial Resistance (AMR) Containment

Objectives:

- Establish a laboratory-based AMR surveillance system in the country to generate quality data on antimicrobial resistance.
- Carry out surveillance of antimicrobial usage in different healthcare settings.
- Strengthen infection control practices and promote rational use of antimicrobials through antimicrobial stewardship activities.
- Generate awareness amongst healthcare providers and community on antimicrobial resistance and rational use of antimicrobials.

Functioning and Outcome:

- AMR surveillance.
- National treatment guidelines.
- Infection prevention and control guidelines and surveillance of healthcare associated infections.
- IEC activities.
- Strengthening laboratory capacity for AMR detection.

(b) National Programme on Climate Change and Human Health (NPCCHH)

Objectives:

- To create awareness among general population (vulnerable community), healthcare providers and policy makers regarding impacts of climate change on human health.
- To strengthen capacity of healthcare system to reduce illnesses/diseases due to variability in climate.
- To strengthen health preparedness and response by performing situational analysis at national/state/district/below district levels.
- To develop partnerships and create synchrony/synergy with other missions and ensure that health is adequately represented in the climate change agenda in the country.

- To strengthen research capacity to fill the evidence gap on climate change impact on human health.

Functioning and Outcome:

- Awareness and behaviour modification of general population for impact, illnesses, prevention and adaptive measures for climate sensitive illnesses.
- Increase in trained healthcare personnel and equipped institutes/organization towards achievement of climate resilient healthcare services and infrastructure at district level in each state.
- Integrated monitoring system for collection and analysis of health related data with meteorological parameters, environmental, socioeconomic and occupational factors.
- Regulation on key environmental determinants of health: Air quality, water quality, food, waste management, agriculture, transport.
- Evidence-based support to policy makers, programme planners and related stakeholders.

(c) Integrated Disease Surveillance Programme (IDSP)

Objectives:

- To strengthen/maintain decentralized laboratory-based IT enabled disease surveillance system for epidemic-prone diseases to monitor disease trends and to detect and respond to outbreaks in early rising phase through trained rapid response teams (RRTs).

Functioning and Outcome:

- Integration and decentralization of surveillance activities through the establishment of surveillance units at center, state and district levels.
- Human resource development: Training of state surveillance officers, district surveillance officers, rapid response team and other medical and paramedical staff.
- Use of ICT for collection, collation, compilation, analysis and dissemination of data.
- Strengthening of public health laboratories.
- Intersectoral co-ordination for zoonotic diseases.

(d) Intersectoral Co-ordination for Prevention and Control of Zoonotic Diseases

Objectives:

- Strengthening of intersectoral co-ordination between medical, veterinary, wildlife sector and various relevant stakeholders for prevention and control of zoonotic diseases.
- Trained manpower development.
- Sensitization of professionals in various sectors (medical, veterinary, etc.).
- IEC to create awareness among community.

Functioning and Outcome:

- Intersectoral co-ordination.
- State and district level initiative; capacity building.
- Technical support activities.
- IEC activity.

(e) Yaws Eradication Programme (YEP)

Yaws belongs to a group of chronic bacterial infections (endemic treponematoses, non-venereal spirochetal diseases) caused by Treponema. Other diseases belonging to this group are bejel (endemic syphilis) and pinta.

India has been declared yaws-free in July 2016.

25 Give the objectives, functioning and outcome of "National AIDS Prevention and Control Programme" (NACP).

☞ Acquired Immunodeficiency Syndrome (AIDS):

Government of India has announced National AIDS Prevention and Control Strategy. National AIDS Control Organization (NACO) is a division of the Ministry of Health and Family Welfare which provides leadership to HIV/AIDS Control Program in India. Salient features of the policy are as follows.

Objectives:

Specific objectives of the policy are indicated below:

1. To reiterate strongly the government's firm commitment to limit the spread of HIV infection and reduce personal and social impact.

2. To generate a feeling of ownership among all the participants both at the government and non-government levels, like the Central Ministry and agencies of the Government of India, state government, City Corporations, industrial undertakings in public and private sectors, Panchayat Institutions and local bodies to make it a truly national effort.
3. To create an enabling socioeconomic environment for prevention of HIV/AIDS, to provide care and support to people living with HIV/AIDS and to ensure protection/promotion of their human rights including right to access healthcare system, right to education, employment and privacy. To mobilize support of a large number of Non-Governmental Organizations (NGOs)/Community-Based Organizations (CBOs) for an enlarged community initiative for prevention and alleviation of the HIV/AIDS problem.
4. In order to streamline efforts related to control of some common diseases prevalent in a wide range of population, Government of India has initiated certain programmes of national level. The programmes are financed by central government and are implemented through the help of state governments. Information of such diseases is presented here.
5. To decentralize HIV/AIDS Control Program to the field level with adequate financial and administrative delegation of responsibilities.
6. To strengthen program management capabilities at the state governments, Municipal Corporations, Panchayat Institutions and leading NGOs participating in the program.
7. To bring in horizontal integration at the implementation level with other national programs like reproductive and child health, TB control, integrated child development scheme and with the primary healthcare system.
8. To prevent women, children and other socially weak groups from becoming vulnerable to HIV infection by improving health education, legal status and economic prospects.
9. To provide adequate and equitable provision of healthcare to the HIV-infected people and to draw attention to the compelling public health rationale for overcoming stigmatization, discrimination and seclusion in society.

10. To constantly interact with international and bilateral agencies for, support and co-operation in the field of research in vaccines, drugs, emerging systems of healthcare and other financial and managerial inputs.
11. To ensure availability of adequate and safe blood and blood products for the general population through promotion of voluntary blood donation in the country.
12. To promote better understanding of HIV infection among people, especially students, youth and other sexually active sections to generate greater awareness about the nature of its transmission and to adopt safe behavioural practices for prevention.

Functioning and Outcome:

The national AIDS Control Policy principally aims at the following strategy for prevention and control of the disease:

1. Prevention of further spread of the disease by:
   (i) Making the people aware of its implications and provide them with the necessary tools for protecting themselves;
   (ii) Controlling sexually transmitted diseases (STDs) among vulnerable sections together with promotion of use of condom as a preventive measure;
   (iii) Ensuring availability of safe blood and blood products; and
   (iv) Reinforcing the traditional Indian moral values among youth and other impressionable groups of population.
2. To create an enabling socioeconomic environment so that all sections of population can protect themselves from the infection, and families and communities can provide care and support to people living with HIV/AIDS.
3. Improving services for the care of people living with AIDS in times of sickness, both in hospitals and at homes through community healthcare.
4. It involves several policy initiatives listed below:
   - Programme management
   - Advocacy and social mobilization
   - Participation of Non-Governmental Organizations (NGOs)
   - Control of sexually transmitted diseases (STDs)
   - Use of condoms as a HIV/AIDS prevention measure

- Human immunodeficiency virus (HIV) testing
- Counseling
- Care and support for people living with HIV/AIDS (PLWHAs)
- HIV and iInjecting drug use
- Safety of blood and blood products
- Research and development.

26 Write a note on "School Health Programme". (S. 22)

☞ **School Health Programme:**

- School health is an important branch of community health
- Schools create a unique opportunity to improve both the education and health status of learners throughout the nation.
- The School Health Programme under 'AYUSHMAN BHARAT' is a joint collaborative programme between the Ministry of Health and Family Welfare and Ministry of Human Resource and Development.
- National Rural Health Mission (NRHM) provides school health programmes for health of the students.

Following rights of the child have been recognized:

- The right to survival.
- The right to protection.
- The right to development.
- The right to participation.

An effective school health, hygiene and nutrition programme offers following benefits:

- It responds to an increased need.
- It increases the efficacy of other investments in child development.
- It ensures good current and future health.
- It improves social equity.
- It is a highly cost effective strategy.

Essential elements of school health are as follows:

- **Health-related school policies:** These include children of all communities, encourage healthy lifestyles, address priority

public healthcare programmes and promote collaboration among teachers. It also enables students and their parents on one hand and departments like health, education, women and child development on the other hand to bring conversions.

- Provision of safe (physically and psychosocially) and supportive environment to ensure healthy development of students and provide a healthy learning environment. Provision of nutrition relieves the hunger of the child and provision of the safe water and adequate sanitation reinforces hygienic behaviour. It is necessary to provide privacy (functional women toilets and support for menstrual management) and safety to promote participation of adolescent girls in education. It is necessary to keep the school free of violence and various forms of discrimination.
- Health, hygiene and nutrition education, which focuses on the development of age-appropriate knowledge, attitudes, values and life skills needed to establish lifelong healthy practices.
- School-based health and nutrition services that are equitable, simple, sustainable, safe and familiar and address problems that are prevalent and recognized as important within the community, e.g. mid-day school meals.

27 Explain the role of pharmacist in "National Health Programmes".

- Pharmacists are well trained and knowledgeable to advance the mission of Public Health.
- The knowledge, skills and expertise of a pharmacist enable them to support the public healthcare by promoting healthy life- styles, preventing long-term illness and by guiding patients to better manage their medicines.
- A community pharmacist strengthen the public health system in a broad perspective.
- Pharmacists have a great significant role to play in all national health programmes.
  1. A pharmacist can improve healthcare of all Indian citizens.
  2. A pharmacist can be indulged in the prevention and control of disease in a many ways.
  3. Pharmacists play a vital role in screening of various diseases, e.g. diabetes, hypertension, liver fibrosis.

4. Pharmacists provide information and skills to individuals so that they can prevent specific diseases.
5. Pharmacist may involve in immunization programmes and provide an advice on healthy lifestyles.
6. Pharmacist helps in counseling and advising the public on the treatment of minor ailments.

The pharmacist can play an important role in top five national public health programmes:

(a) AIDS Control Program:

- Indian Pharmaceutical Association (IPA), since 2000 has taken an initiative in creating awareness on roles and opportunities for pharmacists in HIV/AIDS care and prevention.
- National pharmacy week is celebrated every year which involves the activities like "pharmacist to fight against HIV/AIDS", "guiding principles for pharmacists", etc.
- Involvement of pharmacists in National AIDS Control Organization (NACO) activities such as storage, procurement, distribution and proper use of antiretroviral (ARV) medicines.
- Pharmacist working in antiretroviral therapy (ART) centres and link ART centres were being trained by the department of AIDS control.
- Training to pharmacist and students may increase an interest to take active part in HIV/AIDS control.
- Active participation of pharmacists in ARV therapy programme resulted into better patient outcome.
- Pharmacist involvement in the care of HIV positive patients has been associated with improved patient outcomes, enhanced adherence, reduced pill burden, dosing frequency, etc.

(b) Revised National Tuberculosis Control Programme (RNTCP)

- Pharmacists can play a key role in prevention and treatment of tuberculosis by promoting adherence, assessing patient risk factors for resistant disease, monitoring effectiveness, adverse effects and drug interactions.
- Pharmacists help the patients during choice of the treatment and appropriate healthcare facilities.
- Pharmacist involves in rational use of anti-TB medicines.
- Joint venture of community pharmacists and IPA for control and prevention of TB.

- First time in 2010, RNTCP guidelines mentioned "pharmacists" as a specialist with expertise in managing multi rrug-resistant tuberculosis (MDR-TB), which is very motivating for the pharmacy profession in the country.

(c) Pulse Polio and Universal Immunization Programme.

- Pharmacists take an active part in these programs.
- Pharmacists make the vaccines available for National Immunization Programme by reducing time.
- Trained and certified pharmacists may administer the vaccines and utilize agreed protocols.
- Pharmacists play an important role in knowing the immunization schedule, recommending specific vaccine.

(d) National Tobacco Control Program (NTCP): (W. 22)

- Pharmacists and pharmacy students actively take a part in tobacco control.
- Pharmacists create an awareness in public to stop smoking by guiding toxic effects of the tobacco.
- Pharmacist can participate in anti-tobacco rally.
- Pharmacists can be an integral part of fight to quit smoking.

(e) National Program on Control of Blindness (NPCB): (W. 22)

- Pharmacists play an active role in NPCB.
- Pharmacist helps to reduce backlog of blindness through identification and treatment of blindness.
- Pharmacist can counsel and give guidance to the public to prevent blindness.
- Pharmacist makes availability of ophthalmic products to the general public.
- Pharmacist can help in eye donation and free eye checkup camps.

28 Describe National Health Policy (S. 22).

The Alma-ata declaration of 1978 emerged as a major milestone of 12the century in the field of public health and it is identified a primary health care as the key to the attainment of the goal of "Health for All" around the globe.

Health policy of a nation is its strategy for controlling and optimizing the social uses of its health knowledge of intended objectives. The Ministry of Health and Family Welfare, Govt. of India, released a National Health Policy in 1983 till 2002. It is stressed the need for

comprehensive primary healthcare senices for improving environment of health. The priority area includes:

a. The Swacch Bharat Abhiyan.
b. Balanced, healthy diet and regular exercises.
c. Addressing tobacoo, alcohol and substance abuse.
d. Yatri Suraksha.
e. Nari Abhiyan.
f. Reduced stress and improved safety in the workplace.
g. Reducing indoor and outdoor air pollution.

29 Write about Ayushman Bharat (PM-JAY). (S. 22)

Ayushman Bharat, Pradhan Mantri Jan Arogya Yojana (PM-JAY) or "Healthy India" is a National initiative launche as a part of National Health Policy 2017, in order to achieve the vision of Universal Health Coverage (UHC).

Benefits of Ayushman Bharat (PM-JAY)

1. Government provides health insurance cover of up to ₹ 5,00,000/- per family per year.
2. All families listed in the Socio-Economic and Caste Census (SECC) database as per defined criteria will be covered.
3. No cap on family size and age of members
4. Priority to girl child, women and senior citizens.
5. Free treatment available at all pubic and empanelled private hospitals in times of need.
6. Covers secondary and tertiary care hospitalization.
7. Cashless and paperless access to quality healthcare services.

30 Explain the role of Phamacist in National Health Programmes. (W. 22, S. 24)

1. Early detection and prompt referal for treatment by identifying symptomatic cases.
2. Ensuring rational use of prescribed medicines.
3. Counselling to the patient, providing consumer health information.
4. Early detection and identification of TB suspects, avoiding diagnostic delays
5. Pharmacist should be involved in procurement, storage and distribution of quality medicines.
6. Spreading the message of the small family norm and its advantages.

7. Providing a reservoir of knowledge on family planning methods.
8. Counselling the patients and creating awareness among the public about healthcare.
9. Pharmacist should involve in HIV control programme, polio vaccination program, etc.
10. Distributing family planning literature freely so that the customer can carry it home.

31 Explain the objective and out comes of Janani Suraksha Yojana (JSY) of Govt. of India. (W. 23)

Janani Suraksha Yojana

It is a safe motherhood intervention under the National Health Mission. The scheme is launched on 12th April 2005 by the Honorable Prime Minster, is under implementation in all Union Territories, with a special focus on low performing states (LPS).

Objectives of JSY

1. Reducing the maternal mortality ratio and infant mortality rate.
2. Increasing institutional deliveries in BPL families.
3. Providing cash assistance to eligible pregnant women.

Outcomes of the JSY

The Janani Suraksha Yojana (JSY) is a cash transfer program that provides benefits to pregnant women who have antenatal checkups and delivery in health centers or hospitals.

The program has following outcomes:

1. In creased institutional delivery.
2. Improved antenatal care.
3. Reduced perinatal and neonatal deaths.
4. Improved contraception, breastfeeding and postnatal checkups.
5. Increased beneficiaries.

OBJECTIVE QUESTIONS WITH ANSWERS IN BOLD LETTERS

1. Health means **ability to remain free from illness**.
2. NGO stands for **Non-Governmental Organization**.
3. PHC stands for **primary healthcare centres**.
4. **Palliative care** is specialized medical care for people living with serious illness.
5. DGHS stands for **Director General of Health Services**.
6. NAMP means **National Antimalarial Programme**.
7. NACP stands for **National Aids Control Programme**.
8. ASHA stands for **Accredited Social Health Activist**.
9. Pulse Polio Inoculation Programme was launched in **1995**.
10. AIDS can be transmitted by **blood transfusion**.
11. IDSP means **Integrated Disease Surveillance Programme**.
12. BCG stands for **Bacillus Calmette Guerin**.
13. IEC stands for **information, education and communication**.
14. NHM stands for **National Health Mission**.
15. World's AIDS day was celebrated on **1st December**.
16. Full form of NLEP is **National Leprosy Eradication Programme**.
17. **To improve maternal health** is one of the millennium development goal.
18. The NACO is **National AIDS Control Organization**.
19. NLEP functions for the control and prevention of **leprosy**.
20. Directly Observed Treatment-Short Course (DOTS) was launched in India for the treatment of **tuberculosis**.

Chapter
6

Pharmacoeconomics

1 Define pharmacoeconomics. Explain basics of pharmacoeconomics. Give the objectives/Importance to study the pharmacoeconomics. (S. 23, 24, W. 22, 23)

☞ **Pharmacoeconomics:**

Pharmacoeconomics is defined as "the branch of economics that uses cost-benefit, cost-effectiveness, cost-minimization, cost-of-illness and cost-utility analyses to compare pharmaceutical products and treatment strategies".

☞ **Explanation:**

- Pharmacoeconomics is a sub-discipline of health economics.
- A pharmacoeconomic study evaluates the cost and effects of a pharmaceutical product.
- Pharmacoeconomics refers to the scientific discipline that compares the value of pharmaceutical drug to drug therapy another.

☞ **Objective/Importance of Pharmacoeconomic Study:**

1. It helps to decide which drug is to develop.
2. To estimate and understand the full impact of new therapy.
3. To make an informed decision regarding appropriate use of drugs which have been developed.
4. To make the best use of limited resources.
5. To determine which healthcare alternative provide the best healthcare outcome in term of money spent.
6. To improve allocation of resources for pharmaceutical products and services.

☞ **Basics of Pharmacoeconomics:**

- Pharmacist can improve the efficiency of his profession by implementing principles of pharmacoeconomics.

- Pharmacoeconomics adapts and applies the principles and methodology of health economics to the field of pharmaceutical policy.
- Cost involved in pharmacoeconomic evaluation can be divided into:
  (i) Financial cost (mandatory cost)
  (ii) Economic cost (resources for which no mandatory payment is made)
  (iii) Opportunity cost.

Various costs can be measured while weighing up the cost of invention

(a) Direct cost: Staff cost, capital cost, drug acquisition cost
(b) Indirect cost: Cost experienced by the patient/family/friends.

The cost can be measured in the following ways:

- Cost/unit (cost/tablet, cost/capsule)
- Cost/treatment
- Cost/person
- Cost/person/year
- Cost/case prevented
- Cost/life saved
- Cost/DALY (disability-adjusted life years)

2 What is pharmacoeconomic evaluation? Explain its methods.

☞ Pharmacoeconomic Evaluation:

It is the evaluation of the cost and effects of the pharmaceutical products.

- Pharmacoeconomic evaluation is important for the inclusion in formularies or coverage by the drug insurance companies.
- It produces the best health outcome for the resources invested.

There are four methods of pharmacoeconomic evaluation:

1. Cost-minimization analysis (CMA): It involves measuring only costs, usually only to health services, e.g. prescribing a generic preparation instead of a brand leader.

2. Cost-effectiveness analysis (CEA): It refers to the whole of economic evaluation but specifically a particular type of evaluation in which the health benefit can be defined and measured in natural units, e.g. years of life saved, ulcers healed, etc.

3. Cost-utility analysis (CUA): It is similar to cost-effectiveness but the outcome is a unit of utility, e.g. quality-adjusted life years (QALY).

4. Cost-benefit analysis (CBA): In this case, the benefit is measured as the associated economic benefit of an intervention, e.g. monitory value of returning a worker to employment earlier.

3 What is health maintenance organization (HMO)? Give its role/objectives.

☞ **Health Maintenance Organization (HMO):**

It is a network or organization that provides health insurance coverage for a monthly or annual fee.

☞ **Role of Health Maintenance Organizations (HMOs):**

1. To focus on overall patient wellness and preventive healthcare while keeping costs low for its members by only covering in-network physicians and facilities.
2. It provides basic and supplemental health services to its subscribers.
3. It tries to maintain the health of their patients cost-effectively.

4 Describe the importance of pharmacoeconomics. Or What are the main stakeholders involved in pharmacoeconomics? Explain how pharmacoeconomics is important to the stakeholders.

☞ **Stakeholders of Pharmacoeconomics:**

1. Pharmaceutical manufacturers.
2. Healthcare practitioners/prescribers
3. Pharmacists
4. Patients.

☞ **Importance of Pharmacoeconomics to Stakeholders:**

(1) To pharmaceutical manufacturers:

- Pharmaceutical manufacturers need to spend lot of resources in the drug development process.
- By planned pharmacoeconomic research, manufacturers can avoid spending of vast resources.

- Manufacturers may develop the drug which will be cost effective.
- It can help in decision making, in accessing the affordability of medicines to the patients, access to the medicines when needed and comparing various products for treatment of disease.
- It is very important to drug manufacturer in terms of communicating to external decision makers (payers, prescribers, patients), the value of their products, achieving regulatory and reimbursement approval and contributing to commercial success.

(2) To Healthcare practitioners/prescribers:

- Pharmacoeconomics helps to aid clinical and policy decision making.
- It helps to increase the access to high quality essential medicines.
- It helps the policy makers and the healthcare providers in decision-making in evaluating the affordability of and access to rational drug use.
- It helps to provide access to right medication to the right patient at the right time.

(3) To the pharmacists:

- To measure and compare the cost of drug.
- To improve efficiency of pharmacy profession.
- To make the drugs affordable to the patient.
- To make the drug available to the right patient at the right time.
- To provide rational drug therapy.
- To identify the consequences of drug therapy to healthcare system and society.
- To adjust drug budgets.

(4) To the patients:

- Patients are the final beneficiaries of the treatment.
- Pharmacoeconomics helps to provide cost effective and safe medicines to the patients.
- Availability of better choices of drugs to the patient.

- Doctors consider, the affordability of drugs by the patient which will benefit to the patient.
- Pharmacoeconomics focuses on the cost and benefits of drug therapy which utimately benefits the patient.

5 What is Health Insurance? Give its types. (S. 22)

☞ **Health Insurance:**

Health insurance is an insurance product with covers medical and surgical expenses of an insured individual.

Types of Health Insurance

1. *Group Health Insurance:* It is suitable for employees of an organization
2. *Mediclaim:* It is suitable for in-patient expenses.
3. *Hospital Daily Cash:* It is suitable for daily hospital expenses.
4. *Personal Accident Insurance:* It is suitable for owner-driver to protect them against disability or death caused due to an accident.
5. Maternity health insurance.
6. Family health insurance.

OBJECTIVE QUESTIONS WITH ANSWERS IN BOLD LETTERS

1. **Pharmacoeconomics** study evaluates the cost and effect of a pharmaceutical product.
2. A QALY of 1 means **perfect death**.
3. Pharmacists can contribute in management of Covid-19 at **counterfeiting levels**.
4. The amount paid by customers to get health insurance is called **premium**.
5. The full form of HMO is **Health Maintenance Organization**.
6. CMA stands for **cost minimization analysis**.
7. Pharmacoeconomics analyses the cost of drug therapy to **healthcare system and society**
8. QALY means **quality-adjusted life years**.
9. The term used to refer to the commonly charged or prevailing fees for health services that the patient pays is **U and C charges**.
10. CBA in pharmacoeconmics stands for **cost benefit analysis**.
11. The measurement of unit of CUA is **QALY**.
12. GDP stands for **gross domestic products**.
13. DALY stands for **disability-adjusted life years**.
14. The document which embodies the contract in health insurance is called **policy**.
15. CUA stands for **cost utility analysis**.

Miscellaneous

(A) Long Forms:

AIDS	Acquired immunodeficiency syndrome
ASHAs	Accredited social health activists
AYUSH	Ayurveda, Yoga, Unani, Siddha, Homeopathy.
BBT	Basal body temperature
BCC	Behavioral change communication
BCG	Bacillus Calmette-Guérin
CDSCO	Central Drug Standardization Control Organization.
CHD	Coronary heart disease
COVID-19	Coronavirus disease-2019
CPR	Cardiopulmonary resuscitation
CSSM	Child Survival and Safe Motherhood
DALY	Disability-adjusted life years
DHF	Dengue haemorrhagic fever
DNA	Deoxyribonucleic acid
DPMR	Disability prevention and medical rehabilitation
DPT	Toxoid of diphtheria and tetanus
DPTP	Diphtheria, pertusis, tetanus and polio
DSS	Dengue shock syndrome
DT	Diphtheria and toxin
EAAs	Essential amino acids
EPI	Expanded Programme on Immunization
FSSAI	Food Safety and Standards Authority of India
GIT	Gastrointestinal tract
GMF	Genetically modified food
HIV	Human immunodeficiency virus
HMO	Health Maintenance Organization
IDDM	Insulin dependent diabetes mellitus
IEC	Information, education and communication
IHD	Ischemic heart disease
ILO	International Labour Organization
IUD	Intrauterine device
IVM	Integrated vector management

JEV	Japanese encephalitis vaccine
MERS	Middle east respiratory syndrome
MMR	Measles, mumps and rubella combined vaccine
NCDs	Non-communicable diseases
NEAAs	Non-essential amino acids
NFCP	National Filaria Control Programme
NGOs	Non-Governmental Organizations
NIDDM	Non-insulin dependent diabetes mellitus
OOPE	Out-of-pocket expenses
OPV	Oral polio vaccine
ORS	Oral rehydration salt
PEM	Protein energy malnutrition
PHCs	Primary health centres
PMSSY	Pardhan Mantri Swasthya Suraksha Yojana
QALY	Quality-adjusted life years
RAN	Rastriya Arogya Nidhi
RMNCH+A	Reproductive, maternal, newborn, child plus adolescent health
RNA	Ribonucleic acid
RTI	Respiratory tract infection
SARS	Severe acute respiratory syndrome
STD	Sexually transmitted diseases
TAB	Typhoid and paratyphoid A and B
TT	Tetanus toxoid
UIP	Universal immunization programme
USFDA	United States Food and Drug Administration
UTI	Urinary tract infection
VD	Venereal disease
WHO	World Health Organization

(B) Diseases Transmitted

- **Air-borne diseases**
  i. Tuberculosis
  ii. Measles
  iii. Chickenpox
  iv. Whooping cough

v. Influenza
vi. Diphtheria.

- **Water-borne diseases**
  i. Cholera
  ii. Dysentery
  iii. Typhoid
  iv. Amoebiasis
  v. Viral hepatitis
  vi. Poliomyelitis
  vii. Hookworm infestation.

- **Diseases caused by protozoa**
  i. Malaria
  ii. Amoebiasis
  iii. Diarrhoea
  iv. Vaginitis
  v. Urethritis
  vi. Dysentery.

- **Diseases carried by sand fly**
  i. Kala-azar
  ii. Sand fly fever
  iii. Onychomycosis.

- **Diseases carried by house fly**
  i. Diarrhoea
  ii. Dysentery
  iii. Typhoid
  iv. Paratyphoid
  v. Cholera
  vi. Amoebiasis.

- **Diseases carried by mosquitoes**
  i. Malaria
  ii. Filaria
  iii. Yellow fever

- **Sexually transmitted diseases**
  i. AIDS
  ii. Syphilis
  iii. Gonorrhoea
  iv. Donovanosis
  v. Genital herpes
  vi. Vaginitis.

- **Noncommunicable diseases**
  i. Cancer
  ii. Blindness
  iii. Diabetes.
- **Surface infections**
  i. Rabies
  ii. Trachoma
  iii. Tetanus
  iv. Leprosy.
- **Fomite-borne diseases**
  i. Tuberculosis
  ii. Leprosy
  iii. Cholera
  iv. Typhoid
  v. Plague
  vi. Influenza
  vii. Whooping cough
  viii. Measles.
- **Soil-borne diseases**
  i. Diarrhoea
  ii. Amoebiasis
  iii. Cholera
  iv. Dysentery
  v. Hookworm diseases.
- **Zoonotic diseases**
  i. Rabies
  ii. Anthrax
  iii. Plague
  iv. TB
  v. Brucellosis.
- **Diseases transmitted by rodents**
  i. Plague
  ii. Ringworm
  iii. Rat bite fever
  iv. Lassa fever
  v. Amoebiasis
  vi. Salmonellosis.
- **Diseases spread by arthropods**
  i. Malaria
  ii. Plague

iii. Typhoid
iv. Filariasis.

- **Disease spread by animals**
  i. Plague
  ii. Tuberculosis
  iii. Leprosy
  iv. Hookworm infestations.
- **Disease caused by viruses**
  i. Hepatitis
  ii. AIDS
  iii. Poliomyelitis
  iv. Chickenpox
  v. Smallpox
  vi. Rabies
  vii. Influenza
  viii. Measles
  ix. COVID-19
  x. Dengue
  xi. Chikungunya
  xii. Ebola
  xiii. MERS
  xiv. SARS.
- **Disease caused by bacteria**
  i. Tuberculosis
  ii. Leprosy
  iii. Cholera
  iv. Typhoid
  v. Plague.
- **Disease caused by fungi**
  i. Candidiasis
  ii. Dermatophytes
  iii. Onychomycosis.

Board Examination Papers

Summer Examination 2022
(Question Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Attempt any SIX of the following: 30 marks

a. Define Health and discuss various indicators of Health.
b. What are problems of overpopulation? How the population can be controlled?
c. Discuss in detail about importance of breastfeeding, write ill effects of infant milk substitutes.
d. Write symptoms, prevention and treatment of tuberculosis, write full form of DOTS.
e. Write causative organism, mode of transmission, prevention and control of AIDS.
f. Write about causative agent and prevention of typhoid fever and chikungunya.
g. Discuss about various national health programmes of India focusing on communicable diseases.

Q2. Attempt any TEN of the following: 30 marks

a. Describe National Health Policy.
b. Write about ill effects of air pollution and its prevention.
c. Write about hazards of water pollution and its prevention.
d. What is malnutrition? Write ill effects of junk food.
e. Write functions and daily requirements of proteins.
f. Write clinical presentation and control of malaria.
g. Draw the diagram of a typical bacterial cell and name the components.
h. Describe Gram staining method of bacteria.
i. Write prevention and treatment of leprosy.
j. Write about Ayushman Bharat (PM-JAY).
k. What is health insurance? Give its types.

Q3. Solve ALL questions of the following. 20 marks

a. Write a full form of SDG.
b. Write full form of NHP.

c. BCG stands for _____.
d. MTP stands for _____.
e. Write deficiency disorder caused by deficiency of vitamin C.
f. Name any one pandemic disease.
g. Write the name of one vaccine to prevent COVID-19.
h. Name the micro-organism causing cholera.
i. Write the name of one National Health Programme focussing on NCDs.
j. What is HMO?
k. Carcinogens cause_____.
   (a) Cancer (b) Diabetes
   (c) Hypertension (d) TB
l. Lifestyles are learnt from_____
   (a) Parents (b) Mass media
   (c) Friends (d) All of these
m. Increased level of air pollution results in _____.
   (a) Soil erosion (b) Global warming
   (c) Respiratory problem (d) All of these
n. Which is the most common method used to dump solid wasters?
   (a) River (b) Ocean
   (c) Landfill (d) None of these
o. Write full form of 'GM' food.
p. Rabies is a _____.
   (a) Viral disease (b) Bacterial disease
   (c) Fungal disease (d) None of these
q. Polio virus mainly replicates in _____.
   (a) Lungs (b) Liver
   (c) GIT (d) None of these
r. PHC stands for _____.
   (a) Primary hospital centres
   (b) Primary healthcare centres
   (c) Public healthy centres
   (d) Prime human centres
s. National Mental Health Programme was launched in the year ___.
   (a) 1985 (b) 1979
   (c) 1982 (d) 1990
t. Which organization provides blood to patients?
   (a) Medical store (b) Dispensary
   (c) Hospital (d) Blood bank.

Summer Examination 2022
(Specimen Answer Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Attempt any SIX of the following: **30 Marks**

a. Define Health and discuss various indicators of Health.

Ans: Health:

"A state of complete physical, mental and social will-being and not merely an absence of disease or infirmity".

Various indicators of health:

Different Indicators of human health are as:

1. Mortality indicators
2. Morbidity indicators
3. Disability rates
4. Nutritional status indicators
5. Healthcare services indicators
6. Utilization rates
7. Indicators of social and mental health
8. Environmental indicators
9. Socio economic indicators

1. **Mortality indicators:** The meaning of mortality is number of deaths occurring in a given area of specific origin

   The important mortality indicators are as follows.

   - *Crude death rate:* It is defined as the number of deaths per 1000 population per year in a given community.
   - *Life expectancy:* Life expectancy at birth is defined as average number of years that will be lived by those born alive into the population.
   - *Infant mortality indicator:* It is the ratio of deaths under one year of age in a given year to the total number of birth in the same year, usually expressed as rather per 1000 live births.

- *Child mortality rate:* Number of deaths at age 1 to 4 years in a given year per 1000 children in that age group at the midpoint of the year concerned.
- *Maternal mortality rate:* It indicates the proportion of deaths among women of reproductive age.
- *Disease specific mortality:* These are the rates due to specific diseases. For example, mortality rate due to cancer, cardiovascular diseases, etc.

2. **Morbidity indicators:** Meaning of morbidity indicator is the rate at which a disease occurs in the population (proportion of disease to health in a community). These indicators are used to describe the health of those who are actually suffering from diseases.
3. **Disability indicators:** Between two extremities of mortality rates and morbidity rates there are persons who remain disabled for some time or lifelong on recovery from disease or illness.
4. **Nutritional status indicators:** It is a positive health indicator that mainly considers anthropometric measurements (scientific study of measurement and proportions of the human body) of pre-school children, children at school entrance age, and prevalence of low birth weight (less than 2.5 kg).
5. **Healthcare services indicators:** The availability of health services measured in terms of doctor population ratio, population bed ratio, population health center ratio is used as indicators of health.
6. **Utilization rates:** These indicate the extent to which healthcare facilities and services are used by the population in a particular area for a given time. It is influenced by individual additives, services availability and services accessibility.
7. **Indicators of social and mental health:** These are indirect indicators and include the incidents of suicide, murder, other violent act, crimes, road accidents, drug abuse, alcoholism, neglected youth, battered wife and battered children, etc. These indicators provide guide to social action for improving health of people.
8. **Environmental indicators:** It means by which community health is protected is grouped under the heading sanitation. The term covers care of food, disposal of excreta and regulation of the environment.

9. **Socioeconomic indicators:** Measurement of social economic development in terms of population growth rate, per capita income, level of unemployment, literacy rates, etc. is indicative of social economic health status of a community.

b. What are problems of overpopulation? How the population can be controlled?

Ans: Problems of overpopulation

Overpopulation or overabundance is a phenomenon in which a species' population becomes larger than the carrying capacity of its environment.

Population Problem of India: It is because of over population of India; the country is facing variety of problems as – India has only 2.4% of the total land area of the world and possesses 16.7% of the total world population. Present population of India is about 140 crores.

1. **Biological consequences:** Young population is growing tremendously. This causes a great pressure on pediatric care, education, health and other such facilities.
2. **Economic consequences:** Population adversely affects the rate of per capita income. Majority of India's total population lives below the poverty line. Poverty is one of the important causative factors in the epidemiology of diseases.
3. **Social consequences:** More population means less job opportunities, inadequate education facilities, increased illiteracy, inadequate and poor housing facilities, overcrowding which can lead to deterioration in law and order situations.
4. **Health consequences:** Malnutrition, inadequate medical facilities can cause higher death rates in infants and children. There can be high maternal deaths. Increased population leads to increased industrialization, which finally causes pollution problems.

Population control measures

Some of the important methods to control overpopulation are:

1. Education
2. Age of marriage
3. Family planning methods

1. **Education:** People, particularly those in the reproductive age group, should be educated about the advantages of a small family and ill-effects of large families and overpopulation along with various other things such as contraception awareness, nutrition, spacing of children, fertility, etc.
2. **Age of marriage:** Demographers explain that postponement of the female marriage age from 18 years to 20 or 22 years would bring down the birth rate by 20 to 30 per cent. Even a year's postponement in each age group will decrease the total fertility rate much less than the present 2.68% for the country.
3. **Family planning methods:** Various family planning methods suitable in various categories of individuals like use of IUDs and permanent contraception in case of couples who have completed their family. Newly married couples use various temporary physical as well as chemical methods of contraception since an increase in contraceptive use leads to a reduction in the number of births which, all other things being equal, means fewer maternal deaths, fewer stillbirths, and fewer children exposed to the risk of mortality.

c. Discuss in detail about importance of breastfeeding. Write ill effects of infant milk substitutes.

Ans: Importance of breast feeding:

Breastfeeding is the best way to satisfy the nutritional and psychological needs of the baby. Mother's milk (breast milk, human milk) contains all nutrients in correct proportions necessary for the growth and development of the baby.

It has inherent anti-infective properties which no other milk has. This protective function of human milk is particularly important in India where exposure to infections is common. It is essential that the baby gets the first breast-milk called colostrum which is thicker and yellowish than later milk and comes only in small amount in the first few days. Colostrum is good for the baby; it will take care of the first hunger. Colostrum is all the food and fluid needed at this time—no supplements are necessary, not even water. Many essential components are in concentrated amounts in colostrum as compared to mature milk, compensating for the low output during early lactation. Breast-milk provides good quality

proteins, fat, vitamins, calcium, iron and other minerals even beyond four months.

Following are the importance of breastfeeding from different perspectives:

1. **For the baby:** Babies who are fed breast milk have a lower risk of infections in the middle ear, urinary tract, gastrointestinal tract (e.g, diarrhoea and vomiting), respiratory tract, etc.
   - Cancers in children.
   - Sudden infant death syndrome.
   - Atopic dermatitis (including eczema and asthma).
   - Obesity in childhood and adulthood.
   - Type 1 and type 2 diabetes can occur in childhood or later in life.

   Development and growth: Breast milk contains important components that aid in the protection and development of a baby's developing immune system. Breast milk is easier to digest than infant formulae, and it adapts from feed to feed to fit each baby's individual needs, making it the optimal diet for healthy growth and development.

   Psychological advantages: Breastfeeding can improve bonding and emotional attachment between mother and baby due to close interaction and frequent skin-to-skin contact.
2. **For the mother:** Breastfeeding has been shown in studies to have significant health benefits for mothers.

   Following are the benefits of breastfeeding for mothers:
   1. May reduce the risk of type II diabetes in mothers who have gestational diabetes.
   2. Can assist women in losing weight following the birth of their child.
   3. Reduces the risk of ovarian and premenopausal breast cancer.
   4. Osteoporosis risk may be reduced.
   5. Assists the uterus in returning to its pre-pregnancy state as quickly as possible.

   Effects of Infant Milk Substitutes: Infant milk substitute formula: It is a cow milk substitute that contains hydrolyzed cow milk protein or goat milk protein as the protein source. There are many ill effects of early weaning and is the leading cause of rising infant mortality.

The ill effects observed are as follows:

i. **Weaning foods at the early stage may weaken a baby's immune system:** Breast milk has been found in research to assist a baby's immune system to develop and improve weaning meals and formula milk, on the other hand, are deficient in important and natural nutrients. Also enzyme amylase is usually detected in the child at the seventh month only, hence digestion of external carbohydrate food starts only after six months. Early weaning may cause problems related to indigestion of carbohydrates. Chances of infections, diarrheal diseases and anemia are common in children with early weaning, because breast milk contains the best bioavailable iron.

ii. **Weaning foods and bottle feeding affects the mother-baby bonding:** For both the mother and the infant, feeding is a bonding process. When the newborn latches on to the mother's breasts, skin-to-skin contact is established. Bottle-feeding may obstruct this bonding process.

iii. **Breastfeeding protects the mother's health:** Breastfeeding mothers, as opposed to bottle-feeding mothers, have a lower risk of developing breast cancer, ovarian cancer, and osteoporosis, according to some studies. Exclusive breast feeding also boosts mother's immune system, delays next pregnancy and reduces insulin needs of diabetic patients.

d. Write symptoms, prevention and treatment of tuberculosis, write full form of DOTS.

Ans: Tuberculosis:

Symptoms:

1. Prolonged cough
2. Rise in temperature in the evening
3. Loss of weight
4. Loss of appetite
5. Weakness
6. Blood in sputum
7. Chest pain
8. Night sweating, etc.

Prevention and Treatment:

1. Early detection and cases
2. Immunization with BCG vaccine. Importance of boiling milk should be taught.

3. Isolation of case at home and at hospital in the well-ventilated area.
4. Exclusion of contact children from school for 2 weeks.
5. Rehabilitation of patients by providing work which will suit his abilities.
6. Importance of a balanced diet should be taught.
7. People should be educated not to spit in the public places.
8. Preventive treatment, i.e. Chemoprophylaxis by INH, rifampicin, ethambutol or combination of them.

Full form of DOTS: Directly observed treatment, short course.

e. Write causative organism, mode of transmission, prevention and control of AIDS.

Ans: AIDS:

Causative organism: AIDS is a viral infection caused by human immunodeficiency virus (HIV)

Mode of transmission:

1. Through sexual contact with the infected person it is transmitted through vaginal, anal or oral sex.
2. Through contaminated needles and syringes especially those used by drug addicts.
3. Maternal transmission through placenta.
4. Blood contacts through transfusion of contaminated blood and blood products.

Prevention and control:

1. Screening of blood donors for HIV.
2. Use of disposable syringes for injection.
3. Screening of high risk groups like prostitutes and drug addicts.
4. Avoid going to prostitutes for sexual intercourse.
5. Do not indulge in oral or anal sex.
6. Avoiding promiscuous sexual contact.
7. Have only one uninfected sexual partner and do not indulge with multiple sex partners.
8. Use of contraceptives like Nirodh.
9. Instruments used for piercing the nose, tattooing, etc. carry a high risk of transmitting the disease properly sterilized.
10. Treatment with antiviral agents like azidothymidine. It can prolong the life of a patient.

11. Health education about AIDS, its problems and methods of prevention.

f. Write about causative agent and prevention of typhoid fever and chikungunya.

Ans: 1. Typhoid

Causative agent: It is caused due to bacteria *Salmonella typhi*

Prevention and control:

1. Control of the reservoir.
2. Early diagnosis by culture of stool and blood.
3. Isolation of the patient to prevent the spread of infection.
4. Disinfection of stool and urine.
5. Water and milk should be consumed only after proper boiling.
6. Education of people for sanitary measures like safe drinking water, food and personal hygiene.
7. Immunization with TAB vaccine containing *S. typhi, S. paratyphi A* and *S. paratyphi B.*
8. Treatment with antibiotics such as chloramphenicol.

2. Chikungunya causative agent: Chikungunya virus (CHIKV)

Prevention and control:

1. Mosquito control. Paracetamol to reduce fever and pain.
2. Do not take aspirin and other non-steroidal anti-inflammatory drugs (NSAIDS until dengue can be ruled out to reduce the risk of bleeding).
3. Health education

g. Discuss about various national health programmes of India focusing on communicable diseases.

Ans: Programmes aimed at controlling communicable diseases:

1. Integrated Disease Surveillance Programme (IDSP)
2. Revised National Tuberculosis Control Programme (RNTCP)
3. National Leprosy Eradication Programme (NLEP)
4. National Vector Borne Disease Control Programme
5. Programme for Prevention and Control of leptospirosis
6. National AIDS Control Programme (NACP)
7. Pulse Polio Programme
8. National Viral Hepatitis Control Program

1. **Integrated Disease Surveillance Programme (IDSP)**
   ***Objectives*:**
   To strengthen/maintain decentralized laboratory-based IT enabled disease surveillance systems for epidemic-prone diseases to monitor disease trends and to detect and respond to outbreaks in the early rising phase through trained rapid response teams (RRTs).

   Functioning and Outcome:
   i. Integration and decentralization of surveillance activities through the establishment of surveillance units at center. State and district levels
   ii. Human resource development Training of state surveillance officers, district surveillance officers, rapid response team and other medical and paramedical staff.
   iii. Use of ICT for collection, collation, compilation, analysis and dissemination of data
   iv. Strengthening of public health laboratories.
   v. Inter-sectoral coordination for zoonotic diseases.
2. **Revised National Tuberculosis Control Programme (RNTCP)*:***

   Objectives:
   Vision: TB-free India with zero deaths, disease and poverty due to tuberculosis.
   Goal: To achieve a rapid decline in burden of TB, morbidity and mortality while working towards elimination of TB in India by 2025.

   Functioning and Outcome:
   i. New scheme evolution by The Ministry of Health and Family Welfare (MoHFW) in the private sector too for suitable incentives to the private doctors and patients benefits.
   ii. A robust, modern management and information service (MIS) system will be developed to monitor the newly diagnosed as well as existing cases of TB on delivery of the drug kit to the patient, compliance to treatment regimen, etc.
   iii. The availability of rapid molecular tests for patients referred by any private doctor or institute.

iv. To improve the compliance of the TB patients to the treatment regimen, MoHFW will start customized SMS services to the individual patients on a regular basis reminding them about the time to consume the drugs.
v. The MoHFW will establish mechanisms for facilitating nutritional support to the TB patients, including financial support through different modes.
vi. TB Corpus Fund: To improve financial sustainability in the TB sector.

3. National Leprosy Eradication Programme (NLEP)

Objectives:

i. To reduce the prevalence rate of leprosy less than 1/10,000 population at sub-national and district level.
ii. To-reduce grade II disability % <1 among new cases at national level.
iii. To reduce grade II disability cases <1 case per million population at national level.
iv. Zero disabilities among new child cases.
v. Zero sigma and discrimination against the persons affected by leprosy.

Functioning and Outcome:

i. NLEP functions under the National Health Mission (NHM).
ii. Diagnosis and treatment of leprosy.
iii. Capacity building.
iv. Disability prevention and medical rehabilitation.
v. NGO services.

Q2. Attempt any TEN of the following: 30 Marks

a. Describe National Health Policy.

Ans: National Health Policy: The National Health Policy of 1983 and the National Health Policy of 2002 have served well in guiding the approach for the health sector in the five-year plans.
Now 20 years after the last health policy, the context has changed in four major ways.

- First, health priorities are changing. Although maternal and child mortality has rapidly declined, there is a growing burden on account of non-communicable diseases and some infectious diseases.

- The second important change is the emergence of a robust healthcare industry estimated to be growing at double-digit.
- The third change is the growing incidences of catastrophic expenditure due to healthcare costs, which are presently estimated to be one of the major contributors to poverty.
- Fourth, rising economic growth enables enhanced fiscal capacity. Therefore, a new health policy responsive to these contextual changes is required.

The primary aim of the National Health Policy, 2017, is to inform, clarify, strengthen and prioritize the role of the Government in shaping health systems in all its dimensions—investments in health, organization of healthcare services, prevention of diseases and promotion of good health through cross-sectoral actions, access to technologies, developing human resources, encouraging medical pluralism, building a knowledge base, developing better financial protection strategies, strengthening regulation and health assurance.

Goal

The attainment of the highest possible level of health and wellbeing for all at all ages, through a preventive and promotive healthcare orientation in all developmental policies, and universal access to good quality healthcare services without anyone having to face financial hardship, therefore. This would be achieved through increasing access, improving quality, and lowering the cost of healthcare delivery.

Objectives

1. Improvement in health status through preventive, promotive, curative, palliative and rehabilitative services provided through the public health sector with a focus on quality.
2. Availability of free primary healthcare services for all infectious and non-infectious diseases.
3. Access to affordable quality secondary and tertiary healthcare services through private-public partnerships in hospitals.
4. Reinforce trust in the public healthcare system.
5. Enhance life expectancy and quality of life for the population.

b. Write about ill effects of air pollution and its prevention.

Ans: Effects of Air Pollution:

1. Health Impacts:

- *Respiratory problems:* Pollutants like particulate matter (PM2.5 and PM10), nitrogen dioxide (NO_2), and sulfur dioxide (SO_2) can irritate the respiratory system, leading to conditions like asthma, bronchitis, and chronic obstructive pulmonary disease (COPD).
- *Cardiovascular issues:* Air pollution is linked to increased risk of heart attacks, strokes, and hypertension. Pollutants can contribute to inflammation and oxidative stress, affecting heart health.
- *Premature death:* Long-term exposure to high levels of air pollution is associated with increased mortality rates due to respiratory and cardiovascular diseases.
- *Impact on children:* Children are particularly vulnerable to air pollution, which can affect lung development, cognitive function, and overall health.

2. Environmental Impact:

- *Climate change:* Greenhouse gases such as carbon dioxide (CO_2) and methane (CH_4) contribute to global warming, leading to more extreme weather events, rising sea levels, and disruptions to ecosystems.
- *Ecosystem damage:* Pollutants can harm plants and animals. Acid rain, caused by SO_2 and NO_2, can damage forests, lakes, and soil. Pollutants can also disrupt food chains and biodiversity.
- *Visibility reduction:* Air pollution can cause smog and haze, reducing visibility and affecting outdoor activities and tourism.

3. Economic Costs:

- *Healthcare expenses:* The health impacts of air pollution result in increased healthcare costs for treating respiratory and cardiovascular conditions.
- *Loss of productivity:* Illness and premature deaths due to air pollution can lead to decreased workforce productivity.

- *Environmental damage:* The degradation of natural resources and ecosystems can lead to significant economic losses, including impacts on agriculture and property values.

Prevention and Mitigation Strategies:

1. ***Reducing Emissions:***
   - *Regulations and standards:* Implement and enforce stricter air quality standards and regulations for industries and vehicles to limit emissions of pollutants.
   - *Clean energy:* Promote the use of renewable energy sources such as wind, solar, and hydropower to reduce reliance on fossil fuels.
   - *Energy efficiency:* Improve energy efficiency in buildings, appliances, and industrial processes to reduce overall energy consumption and emissions.
2. ***Transportation Solutions:***
   - *Public transport:* Invest in and encourage the use of public transportation systems to reduce the number of vehicles on the road.
   - *Electric vehicles:* Support the adoption of electric and hybrid vehicles to cut down on emissions from conventional internal combustion engines.
   - A*ctive transportation:* Promote walking, cycling, and other forms of active transportation that have minimal environmental impact.
3. ***Urban Planning and Green Spaces:***
   - *Green urban areas:* Incorporate more green spaces, parks, and trees in urban areas to absorb pollutants and provide cleaner air.
   - *Sustainable development:* Plan urban development with a focus on sustainability, including energy-efficient buildings and low-emission transportation options.

c. Write about hazards of water pollution and its prevention.

Ans: The main water pollutants include bacteria, viruses, parasites, fertilizers, pesticides, pharmaceutical products, nitrates, phosphates, plastics, fecal waste and even radioactive substances.

Hazards of water pollution:

i. *Destruction of biodiversity*: Water pollution depletes aquatic ecosystems and triggers excessive growth of phytoplankton

(microalgae) in lakes due to eutrophication (excessive presence of nitrates, phosphates, etc).

ii. *Contamination of the food chain:* Fishing in polluted waters and the use of waste water for livestock farming and agriculture can introduce toxins into foods which are harmful to our health when eaten.

iii. *Lack of potable water:* The UN says that billions of people around the world have no access to clean water to drink or sanitation, particularly in rural areas.

iv. *Diseases:* The WHO estimates that about 2 billion people have no option but to drink contaminated water. It leads to several diseases such as cholera, hepatitis A, dysentery, diarrhoea, giardiasis, typhoid and several other GI infections.

Prevention of Water pollution

i. Protecting water resources
ii. Legislation, strict implementation and monitoring for proper disposal of industry waste, agricultural waste, pharmaceutical waste, radioactive waste, plastic, etc.
iii. Avoiding bathing of animals, humans in water resources
iv. Avoiding defecation near water resources
v. Purification of water on a large scale and household level.

d. What is malnutrition? Write ill effects of junk food.

Ans: Malnutrition:

Malnutrition refers to when a person's diet does not provide enough nutrients or the right balance of nutrients for optimal health. Malnutrition causes several health problems and poses higher risk of infections.

Ill effects of junk:

i. Weight gain and obesity
ii. Lack of proper nutrition, affects immunity
iii. Possibility of developing several non-communicable diseases such as diabetes, hypertension, heart disease.
iv. Learning and memory problems.
v. Loss of appetite and indigestion.
vi. Inadequate growth and development.
vii. Causes fluctuations in blood sugar levels.
viii. Can cause kidney or liver damage.
ix. It causes fatigue and weakness.

x. It affects the brain function.
xi. Affects the microflora in the gut.

e. Write functions and daily requirements of proteins.

Ans: Functions of Proteins:

Proteins are the complex organic compounds with C, H, O, N and occasionally also contain iron, phosphorous, sulfur and other elements

1. Body building, repair and maintenance of tissues.
2. For formation of antibodies, plasma proteins, hemoglobin, enzymes and hormones.
3. Strengthening of immune system.
3. For production of heat and energy.
4. Balancing of fluids and of osmotic pressure.
5. Maintenance of proper pH in body.

Requirement of Proteins:

As per Indian Council of Medical Research (ICMR) for Indians, 0.8 to 1 gm protein per kg body weight per day is sufficient to meet the basic nutritional requirements.

f. Write clinical presentation and control of malaria.

Ans: Clinical Presentation:

Chills, fever at certain time intervals (hot stage) followed by sweating (cold stage), headache, vomiting, diarrhea, abdominal pain, splenomegaly (enlargement of spleen) and hepatomegaly (liver enlargement)

Control of Malaria:

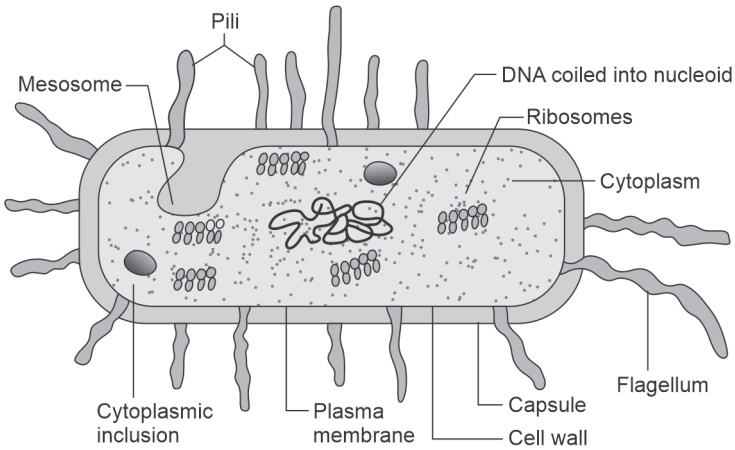
Mosquito control is necessary for control of malaria.

1. **Environmental Control:** It produces long lasting effects. It can be achieved by eliminating of breeding places, filling and drainage operation, proper disposal of refuse and other wastes cleanliness in and around the houses, carefully planned water management, water supply through pipes.
2. **Chemical control:** Insecticides belonging to the organo-chlorine, organophosphorus, carbamate group of compounds can be used for vector control. Malathion, lindane, biomethoate, fenthion can be used to control arthropods. Larvae of mosquito can be killed by Paris green in a concentration of 2% dust spread on water surface or mineral oil spread over the water.

3. **Biological control:** The use of larvivorus fish like Gambusia can be used for the control of mosquitoes.
4. **Protective measures:** Screening of the houses, hospitals, offices by fine gauge screens, use of various mosquito repellents.

g. Draw the diagram of a typical bacterial cell and name the components:

Ans:



Structure of bacterial cell

h. Describe Gram staining method of bacteria

Ans: Gram staining: This is a widely used differential technique for identification of bacteria.

Procedure:

i. Smear (thin microbial film) is prepared on a clean glass slide.
ii. Smear is air dried and fixed by gentle heating.
iii. Crystal violet solution is applied on smear as primary stain for about 1 to 2 min.
iv. Potassium iodide solution (Gram's iodine solution) is applied on smear for 1 to 2 min.
v. Slide is gently washed with water.
vi. Alcohol (95% soln.), now it is applied on smears as a decolouriser.
vii. The secondary stain as counter stain like eosin or saffranin is applied on a smear for 20 to 30 sec.
vii. Finally the slide is washed with water, air dried and observed under the oil-immersion lens of the microscope.

Observation: Gram-positive bacterial cells appear violet in colour, while Gram-negative bacterial cells appear pink in colour.

i. Write prevention and treatment of leprosy.

Ans: Prevention of Leprosy:

i. Early detection and treatment.
ii. Contact tracing of probable cases.
iii. For household contacts, immediate and annual examinations are recommended for at least five years.
iv. Chemoprophylaxis with dapsone.
v. Avoiding close contact with patients.

Treatment of Leprosy:

As per 1982 WHO standardized regimens, treatment is basically three first-line drugs: Dapsone (100 mg), rifampicin (600 mg) and clofazimine (100 mg). This is known as MDT or polychemotherapy. It is given up to 2 years or more.

j. Write about Ayushman Bharat (PM-JAY). What is PM-JAY?

Ans: Ayushman Bharat, Pradhan Mantri Jan Arogya Yojana (PM-JAY) or "Healthy India" is a national initiative launched as part of National Health Policy-2017, in order to achieve the vision of Universal Health Coverage (UHC). It is one of the most ambitious insurance schemes.

This initiative has been designed to meet sustained development goals (SDG) and its commitment, which is "leave no one behind".

Benefits:

i. Government provides health insurance cover of up to ₹ 5,00,000 per family per year.
ii. More than 10.74 crore poor and vulnerable families (approximately 50 crore beneficiaries) covered across the country.
iii. All families listed in the socio-economic and caste census (SECC) database as per defined criteria will be covered.
iv. No cap on family size and age of members.
v. Priority to girl child, women and senior citizens.
vi. Free treatment available at all public and empanelled private hospitals in times of need.
vii. Covers secondary and tertiary care hospitalization.

viii. 1,350 medical packages covering surgery, medical and day care treatments cost of medicines and diagnostics.
ix. All pre-existing diseases covered. Hospitals cannot deny treatment.
x. Cashless and paperless access to quality healthcare services.
xi. Hospitals will not be allowed to charge any additional money from beneficiaries for the treatment.
xii. Eligible beneficiaries can avail services across India, offering benefit of national portability.
xiii. Can reach out for information, assistance, complaints and grievances to a 24 × 7 helpline number 14555

k. What is health insurance? Give its types.

Ans: Health insurance is a type of insurance which covers medical and health related expenses due to hospitalization, medicines, diagnostics, etc.

Types of Health Insurance:

1. Individual health insurance
2. Family health insurance
3. Critical illness insurance (e.g. cancer, stroke, heart diseases, etc.)
4. Senior citizens' health insurance
5. Group health insurance
6. Maternity health insurance

There are two main types:

1. Fixed benefit policies are those that pay a fixed amount following a claim.
2. Indemnity plans are those that provide reimbursement for the money spent on medical treatment.

Q3. Solve all questions of the following: 20 marks

a. Write a full form of SDG.

Ans: SDG: Sustainable Development Goals.

b. Write full form of NHP.

Ans: National Health Policy Or National Health Program.

c. BCG stands for "Bacillus Calmette-Guerin".

d. MTP stands for Medical Termination of Pregnancy.

e. Write deficiency disorder caused by deficiency of vitamin C.

Ans: Scurvy.

f. Name any one pandemic disease.

Ans: COVID-19, SARS, HIV/AIDS, H3N2, smallpox, plague, tuberculosis, polio, influenza, cholera, Russian flu of 1889, Spanish flu, etc.

g. Write the name of one vaccine to prevent COVID-19.

Ans: Covishield, Covaxin, Sputnik V, etc.

h. Name the micro-organism causing cholera.

Ans: *Vibrio cholerae*.

i. Write the name of one National Health Programme focussing on NCDs.

Ans:

1. National Tobacco Control Programme (NTCP)
2. National Programme for Prevention and Control of Deafness (NPPCD)
3. National Mental Health Programme
4. National Programme for Control of Blindness and Visual Impairment

j. What is HMO?

Ans: HMO is Health Maintenance Organization.

k. Carcinogens cause _____

(a) Cancer (b) Diabetes
(c) Hypertension (d) TB

Ans: (a) Cancer

l. Lifestyles are learnt from _____

(a) Parents (b) Mass media
(c) Friends (d) All of these

Ans: (d) All of these

m. Increased level of air pollution results in _____.

(a) Soil erosion (b) Global warming
(c) Respiratory problem (d) All of these

Ans: (c) Respiraory problem or (d) All of these

n. Which is the most common method used to dump solid wasters?

(a) River (b) Ocean
(c) Landfill (d) None of these

Ans: (c) Landfill

o. Write full form of 'GM' food.

Ans: 'GM' food means Genetically Modified food.

p. Rabies is a _____.

(a) Viral disease (b) Bacterial disease
(c) Fungal disease (d) None of these

Ans: (a) Viral disease

q. Polio virus mainly replicates in _____.

(a) Lungs (b) Liver
(c) GIT (d) None of these

Ans: (c) GIT

r. PHC stands for _____.

(a) Primary hospital centres
(b) Primary healthcare centres
(c) Public healthy centres
(d) Prime human centres

Ans: (b) Primary healthcare centres

s. National mental health programme was launched in the year _____.

(a) 1985 (b) 1979
(c) 1982 (d) 1990

Ans: (c) 1982

t. Which organization provides blood to patients?

(a) Medical store (b) Dispensary
(c) Hospital (d) Blood bank.

Ans: (d) Blood bank.

Winter Examination 2022
(Question Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Answer any SIX of the following: **30 Marks**

a. Enlist various National Health Programmes implemented by Government of India. Explain in short Revised National Tuberculosis Contract Programme (RNTCP) and National Programme for Control of Blindness.

b. Define 'Immunity' and explain National Immunization Schedule.

c. What are FIP development goals and elaborate on National Health Policy.

d. Give Causative agent, Clinical presentation, and role of pharmacist in the following infections (any two).

   i. AIDS

   ii. Typhoid

   iii. Covid -19

e. Discuss the stages of demographic cycle and explain the role of pharmacist in family planning.

f. Give the classification of communicable diseases and explain the role of pharmacist in prevention of them.

g. Define 'epidemiology." and state the applications of epidemiology. Explain the terms: Epidemic, Endemic and Pandemic.

Q2. Answer any TEN of the following: **30 Marks**

a. Define health and explain various dimensions of health.

b. Give the long form of the following abbreviations.

   i. BCG

   ii. DPT

   iii. HIV

c. What is artificial ripening? Enlist the chemicals used for artificial ripening give ill-effects of it.

d. Enlist various arthropod-borne infections and give the causative agent and mode of transmission of dengue.
e. State what is meant by drug misuse and abuse. Also give prevention and control of drug misuse and abuse.
f. Explain the role of pharmacist in national health programmes.
g. Define microbiology and give the classification of bacteria depending on shape.
h. State what is balanced diet? Enlist various ill effects of junk foods.
i. Define the term "pharmacoeconomics".
j. Explain what noise pollution is. Give the sources and control measures of noise
k. State the causative agent and mode of transmission of:
   i. Whooping cough
   ii. Poliomyelitis
   iii Tetanus

Q3. Answer ALL questions of the following. 20 Marks

a. First National Health Policy was launched in the year _____
   i. 1980 ii. 1988
   iii. 1983 iv. 1990

b. _____ is a permanent sterilization surgery meant for men
   i. Tubectomy ii. Gastrectomy
   iii. Anatomy iv. Vasectomy

c. The causative agent of chickenpox is _____
   i. Varicella zoster ii. *Bordetella pertusis*
   iii. *Vibrio cholerae* iv. Ebola virus

d. Kwashiorkor and marasmus are deficiency disease of _____
   i. Carbohydrates ii Proteins
   iii Lipids iv Waxes

e. _____ programme was initiated by the Government of India during 7th five-year plan in 1987.
   i. Calcium deficiency
   ii. Potassium deficiency
   iii. Iodine deficiency
   iv. Sodium deficiency

f. The chief reason for using _____ is to define monetary value of a saving human life.

i. Cost effectiveness ii. Cost benefit analysis
iii. Direct cost iv Cost treatment

g. Bacteria that appears violet in colour after the staining process is _____

i. Gram-negative bacteria
ii. Gram-positive bacteria
iii. Both i and ii
iv. None of these

h. The breastfeeding awareness week is celebrated by WHO on _____

i. 1st week of August, every year
ii. 2nd week of September, every year
iii. 1st week of July, every year
iv. 2nd week of October, every year

i. FIP consists of _____ board.

i. Board of Pharmaceutical Sciences
ii Board of Chemistry
iii. Board of Microbial Sciences
iv. None of these

j. The headquarter of "National AIDS Control Organization" (NACO) located in _____.

i. Lucknow ii. New Delhi
iii. Kolkatta iv. Izzatnagar

k. Antibiotic-tetracycline shows food interaction with _____.

i. Minerals ii. Cold drinks
iii. Liquors iv. Dairy products

l. Neutral spirit contains _____ alcohol by volume.

i. 45–50% ii. 55–60%
iii. 90–95% iv. 60–70%

m. Incubation period of leprosy is _____.

i. 7–12 years ii. 8–10 years
iii. 10–12 years iv. 2–5 years

n. Sustainable Development Goals (SDGs) adopted by the United Nations has _____ number of goals.

i. 17 ii. 16
iii. 15 iv. 14

o. NPCDCS stands for: National Programme for Prevention and Control of _____

i. Cancer, diabetes, cardiovascular diseases and stroke
ii. Cancer, diplopia, cardiovascular diseases and stroke
iii. Cancer, diabetes, cardiovascular diseases and stupor
iv. Cancer, depression, cardiovascular diseases and stroke

p. Risk of illness or accidents in the workplace is known as _____ hazards.

i. Family ii. Occupational
iii. Social iv. Environmental

q. IEC stand for_____

i. Information, education and communication
ii. Information, economy and communication
iii. Information, enquiry and communication
iv. Information, education and cooperation

r. An ideal health indicator should be _____

i. Valid ii. Reliable
iii. Sensitive iv. All of the above

s. The objectives of National Mental Health Programme (NMHP) are ____

i. To improve environmental sanitation
ii. To improve rural health
iii. To encourage the application of mental health knowledge in general healthcare and social development.
iv. To promote healthy life styles

t. *Entamoeba histolytica* is the causative agent of _____

i. Helminthiasis ii. Giardiasis
iii. Tineasis iv. Amoebiasis

Winter Examination 2022
(Specimen Answer Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Answer any SIX of the following: **30 Marks**

a. Enlist various national health programmes implemented by Government of India. Explain in short Revised National Tuberculosis Contract Programme (RNTCP) and National Programme for Control of Blindness.

Ans: The various national health programmes implemented by Government of India are as follows:

1. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS).
2. National Programme for the Healthcare for the Elderly (NPHCE)
3. National Programme for Prevention and Management of Burn Injuries (NPPMBI)
4. National AIDS Control Programme (NACP)
5. National Leprosy Eradication Programme (NLEP)
6. National Tobacco Control Programme (NTCP)
7. National Programme on Climate Change and Human Health (NPCCHH)
8. National programme for the healthcare for the elderly (NPHCE)

1. Revised National Tuberculosis Contract Programme (RNTCP)

The Government of India launched the National TB Programme (NTP) in 1962. After the declaration of TB as a global emergency by WHO, Government of India re-implemented NTP as Revised National TB Control Programme (RNTCP) in 1993.

Objectives:

1. To achieve a rapid decline in burden of TB, morbidity and mortality while working towards elimination of TB in India by 2025.

2. Early diagnosis and treatment of TB.
3. Find all drug sensitive TB (DSTB) cases and all drug resistant TB (DRTB) cases.

Functioning:

1. Free diagnosis and treatment of TB patients.
2. Testing of all TB patients for drug resistance and HIV.
3. To improve the compliance of the TB patients to the treatment regimen, customized SMS services to the individual patients on a regular basis reminding them about the time to consume the drugs, started by The Ministry of Health and Family Welfare (MoHFW).
4. Nutritional and financial assistance to TB patients.

Outcome:

1. Some states and union territories have committed to end TB even before 2025.
2. The availability of rapid molecular tests for patients referred by any private doctor or institute have notified about 24 lakh patients.
3. About 94% of the people living with HIV are being screened for TB symptoms.
4. In the year 2019, more than 3 lakh people living with HIV were initiated on TB preventative therapy.

2. National Programme for Control of Blindness:

National Programme for Control of Blindness and Visual Impairment (NPCB and VI) was launched in the year 1976 as a 100% centrally sponsored scheme (now 60:40 in all states and 90:10 in NE states) with the goal of reducing the prevalence of blindness to 0.3% by 2020.

Objectives:

1. To reduce the backlog of avoidable blindness through identification and treatment of curable blindness.
2. To develop and strengthen the strategy of NPCB for "eye health for all" and prevention of visual impairment.
3. To enhance community awareness on eye care.
4. Increase and expand research for prevention of blindness and visual impairment.

Functioning:

1. Set up of multipurpose district mobile ophthalmic units in the district hospitals of states & UTs
2. Distribute free spectacles to old patients suffering from presbyopia.
3. Strengthen the tertiary eye-care centres by providing funds for purchase of sophisticated modern instruments.

Outcome:

1. Successful implementation of school eye screening programmes.
2. Eyes for corneal transplantation donated at a number above the set target.
3. Treatment of eye diseases like glaucoma, diabetic retinopathy, childhood blindness, etc. managed successfully.

b. Define 'Immunity' and explain National Immunization Schedule.

Ans: Immunity: The power of the body to resist the effects of invasion of pathogens is known as immunity.

National Immunization Schedule:

Each country has its own immunization schedule based on their local needs. The Indian version of National Immunization Schedule is to protect the children against six vaccine preventable diseases diphtheria, whooping cough, tetanus, polio, tuberculosis, and measles.

National Immunization Schedule (NIS) for infants, children and pregnant women.			
Vaccine	*When to Give*	*Dose*	*Route*
For Infants (1.5 M for any 3 Vaccines)			
Bacillus Calmette-Guerin (BCG)	At birth or as early as possible till one year of age	0.1 ml (0.05 ml until 1 month age)	Intradermal
Hepatitis B – Birth dose	At birth or as early as possible within 24 hours	0.5 ml	Intra-muscular
Oral Polio Vaccine (OPV)-0	At birth or as early as possible within the first 15 days	2 Drops	Oral

OPV 1, 2 and 3	At 6 weeks, 10 weeks and 14 weeks (OPV can be given till 5 years of age)	2 Drops	Oral
Pentavalent 1, 2 and 3	At 6 weeks, 10 weeks and 14 weeks (can be given till one year of age)	0.5 ml	Intramuscular
Rotavirus (RVV)	At 6 weeks, 10 weeks and 14 weeks (can be given till one year of age)	5 drops (liquid vaccine) 2.5 ml (lyophilized vaccine)	Oral
Inactivated polio vaccine (IPV)	Two fractional doses at 6 and 14 weeks of age	0.1 ml	Intradermal two fractional doses
Measles rubella (MR) 1st dose	9 completed months-12 months (measles can be given till 5 years of age)	0.5 ml	Sub-cutaneous
Vitamin A (1st dose)	At 9 completed months with measles—rubella	1 ml (1 lakh IU)	Oral

For Pregnant Women			
Tetanus and adult Diphtheria (Td)-1	Early in pregnancy	0.5 ml	Intramuscular
Td-2	4 weeks after Td1	0.5 ml	Intramuscular
Td- Booster	If received 2 TT/Td doses in a pregnancy with in the last 3 years.	0.5 ml	Intramuscular

c. What are FIP development goals and elaborate on National Health Policy.

Ans: FIP Development goals:

- International Pharmaceutical Federation (FIP) has set targets to meet national, regional, and global healthcare needs. The FIP development goals is a well-designed time bound initiative for pharmacy and its contribution to world health.
- The FIP goals aim at:
  - Assessing and prioritizing national health situations.
  - Educating and developing the workforce.
  - Ensuring good practices.
  - Promoting pharmaceutical innovations.

- There are 21 goals decided as core dimensions of FIP's mission to ensure and promote practice, science, and education in pharmacy.
- FIP development goals are the systematic and integrated approach to meet support objectives of the UN program "Health for all" through the development of the pharmaceutical workforce.

Goal 1 : Academic Capacity.
Goal 2 : Early Career Training Strategy Development.
Goal 3 : Quality Assurance.
Goal 4 : Advanced and Specialist Development.
Goal 5 : Competency Development.
Goal 6 : Leadership Development.
Goal 7 : Advancing Integrated Services.
Goal 8 : Working with others.
Goal 9 : Continuing Professional Development Strategies
Goal 10 : Equity and Equality
Goal 11 : Impact and Outcomes
Goal 12 : Pharmacy Intelligence.
Goal 13 : Policy development
Goal 14 : Medicines Experts.

National Health Policy: The National Health Policy of 1983 and the National Health Policy of 2002 have served well in guiding the approach for the health sector in the five-year plans.

Now 20 years after the last health policy, the context has changed in four major ways.

- First, health priorities are changing. Although maternal and child mortality has rapidly declined, there is a growing burden on account of non-communicable diseases and some infectious diseases.
- The second important change is the emergence of a robust healthcare industry estimated to be growing at double-digit.
- The third change is the growing incidences of catastrophic expenditure due to healthcare costs, which are presently estimated to be one of the major contributors to poverty.
- Fourth, rising economic growth enables enhanced fiscal capacity. Therefore, a new health policy responsive to these contextual changes is required.

The primary aim of the National Health Policy, 2017, is to inform, clarify, strengthen and prioritize the role of the government in shaping health systems in all its dimensions—investments in health, organization of healthcare services, prevention of diseases and promotion of good health through cross-sectoral actions, access to technologies, developing human resources, encouraging medical pluralism, building a knowledge base, developing better financial protection strategies, strengthening regulation and health assurance.

Goal:

The attainment of the highest possible level of health and wellbeing for all at all ages, through a preventive and promotive healthcare orientation in all developmental policies, and universal access to good quality healthcare services without anyone having to face financial hardship, therefore. This would be achieved through increasing access, improving quality, and lowering the cost of healthcare delivery.

Objectives:

1. Improvement in health status through preventive, promotive, curative, palliative and rehabilitative services provided through the public health sector with a focus on quality.
2. Availability of free primary healthcare services for all infectious and non-infectious diseases.
3. Access to affordable quality secondary and tertiary healthcare services through private-public partnerships in hospitals.
4. Reinforce trust in the public healthcare system.
5. Enhance life expectancy and quality of life for the population.

d. Give Causative agent, clinical presentation, and role of pharmacist in the following infections (any two).

i. AIDS
ii. Typhoid
iii. Covid-19

Ans: i. AIDS:

Causative agent: Retrovirus known as HIV (human immuno-deficiency virus)

Clinical Presentations:

i. Breakdown of body's immune system which ultimately leads to life threatening opportunistic infections, neurological disorders, and malignancies.
ii. Weight loss
iii. Fever or night sweating as well as chronic diarrhoea persisting for longer than one month.
iv. Persistent cough and shortness of breath.

Role of Pharmacists in Education and Prevention:

i. Pharmacists can educate the public about AIDS, its problems and methods of prevention to reduce the risk of infection before exposure.
ii. Pharmacists can counsel people about using post-exposure prophylaxis (PEP) to reduce risk of HIV infection after exposure.
iii. Pharmacists can educate people about the importance of having safe sex to prevent AIDS.
iv. Pharmacist can educate the public about getting proper anti-retroviral treatment (ART) to prevent HIV transmission to sexual partners and from mother to child during pregnancy, delivery, and breastfeeding.

ii. Typhoid.

Causative agent: *Salmonella typhi*

Clinical presentations:

i. Prolonged high fever.
ii. Abdominal pain.
iii. Headache.
iv. Diarrhoea or constipation.

Role of Pharmacists in Education and Prevention:

i. Pharmacists can educate people for sanitary measures like safe drinking water, food and personal hygiene.
ii. Pharmacists can promote immunization with TAB vaccine containing *S. typhi*, *S. paratyphi* A and *S. paratyphi* B.
iii. Pharmacists can educate public about getting proper treatment with newer antibiotics such as azithromycin.
iv. Pharmacists can make public aware of the importance of using proper sanitation.

iii. Covid-19.

Causative agent: SARS-CoV-2 virus which is a +ssRNA virus having a crown-like appearance because spike glycoproteins are present on its envelope.

Clinical Presentations:

i. Cough and headache, tiredness, and fever.
ii. Difficulty breathing or shortness of breath loss of speech or mobility, or confusion.
iii. Loss of taste or smell.
iv. Rash on the skin or discolouration of fingers or toes.

Role of Pharmacists in Education and Prevention:

i. Pharmacists can encourage the public to get vaccinated and complete their dose schedules as COVID-19 vaccination is the most effective way to prevent the disease.
ii. Pharmacists can spread awareness about the importance of regular washing of hands and maintaining good personal hygiene.
iii. Pharmacists can educate the public about avoiding close contact with an infected person and self-isolation to prevent the spread of disease.
iv. Pharmacists can educate the public on wearing a properly fitted mask and using an alcohol-based sanitizer for their safety.

e. Discuss the stages of demographic cycle and explain the role of pharmacist in Family Planning.

Ans: Demographic Cycle: It comprises following 5 stages:

1. **First stage:** It is "High Stationary Stage". The feature of this phase is both natality, i.e. birth rate and mortality, i.e. death rate are very high. Both cancel each other keeping population steady. India was in this phase till 1920.
2. **Second stage:** It is "Early Expanding Stage". Here mortality starts falling but birth rate remains same, i.e. higher. As a result, population starts increasing. At present African and South Asian countries are in this phase.
3. **Third stage:** It is "Late Expanding Stage". Her mortality continues to fall but birth rate also started decreasing. But birth rate remains higher than death rate. So, population continues to increase. China, India, Singapore is at this stage.

4. **Fourth Stage:** It is "Low Stationary Stage". It is also called Zero Growth stage as birth rate equals death rate and both are lowered. So net population growth is zero. Many developed countries have reached this stage in last 20 years.
5. **Fifth Stage:** It is "Negative Growth Stage". Here death rate is higher than birth rate. So there is decline in population size. Reasons behind are advancement in medical science and facing problems of population increase. Germany and Hungary are presently at this stage.

Five Stages of Demographic Cycle

5 stages of demographic cycle				
Stage		Birth rate	Death rate	Example
First	High statonary	High	High	India till 1920
Second	Early expanding	High	Declining	South Asia and Africa
Third	Late expanding	Start to decline	Declining	India, China and Singapore
Fourth	Low stationary	Low	Low	UK, Denmark
Fifth	Declining stage	Very low	Low	Germany, Hangary

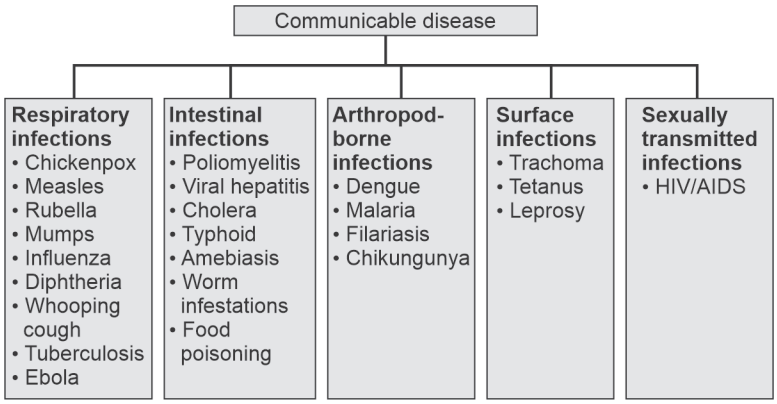
Role of Pharmacist in Family Planning:

1. Display posters of various methods of family planning in hospitals and drug stores.
2. Aware the patients about benefits and methods of family planning.
3. Advice people about the importance of family planning and spacing of children.
4. Distribute pamphlets of family planning.
5. Explain various techniques of contraception and the use of oral contraceptives.
6. Counsel public and conduct educational programmes highlighting the problems associated with high population.
7. Educate and convince people about the advantage of small families.
8. Refer government authorized family planning centres.

f. Give the classification of communicable diseases and explain the role of pharmacist in prevention of them.

Ans: Communicable diseases are the diseases that spread from one person to another through different ways. They are also called infectious diseases.

Classification:



Role of Pharmacists in prevention of communicable diseases:

1. Pharmacists can help public to understand the dangers of communicable diseases and guide them to prevent their occurrence in the community.
2. Pharmacists can counsel people about antibiotic resistance due to irrational use of antibiotics.
3. Pharmacists can counsel people about the importance of completing the entire course of treatment prescribed by the physician to avoid the re-infection of the disease by the pathogen and antibiotic resistance.
4. Pharmacists can create an awareness program for the prevention of arthropod borne diseases and sexually transmitted diseases.
5. Pharmacists can play an important role in vaccination program by counselling people regarding getting themselves vaccinated with proper follow up.
6. Pharmacists can guide the community regarding the importance of hand washing, sanitation, cough/sneezing etiquettes, personal hygiene, nutrition and thereby help in the prevention of communicable diseases.
7. Provide drug related information and consulting to patients and healthcare professionals.
8. Educating the healthcare professionals like doctors about the issues related to drug use process.

9. Pharmacists can help prevent medical errors by increasing patient health literacy.

g. Define 'Epidemiology" and state the applications of Epidemiology. Explain the terms: Epidemic, Endemic and Pandemic.

Ans: Epidemiology: Epidemiology is defined as the study of the distribution and determinants of health-related events and diseases in the population and also the application of this knowledge to control health problems.

Applications of Epidemiology:

1. Epidemiological studies provide information about risk factors, causative agents, a host or carrier, and environmental contributors to the spread of the disease.
2. It helps in the identification of diseases which regularly occur in a community.
3. It provides logical data for the choice of drug, duration of exposure and dose to stop the spread of disease.
4. It helps to devise strategies to treat and prevent diseases in a population.

Endemic (particular area):

Endemic means the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area, restricted to the areas throughout the year.
Endemic diseases are amongst the major health problems in a particular country or continent as a whole, e.g. Ebola, river blindness, etc

Epidemic (rapid mass spread):

Epidemic can be defined as sudden increase of a case of disease which is higher than normal in a specific population. It is the quick and rapid spread of number of cases of a disease above what is normally expected in that population in that area. Epidemics happen when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively transmitted from a source to the susceptible host, e.g: Cholera outbreak, diarrhea outbreak, chickenpox in school going children etc.

Pandemic (world widespread): It is an epidemic that affects large geographical region including different countries or even different continents and usually affecting large number of people

in a short time or at the same time. For example: SARS, influenza, Covid-19 which affected millions of people across the globe.

Q2. Answer any TEN of the following: 30 Marks

a. Define health and explain various dimensions of health.

Ans: Health: "A state of complete physical, mental and social will being and not merely an absence of disease or infirmity".

Dimensions of Health:

1. Physical health
2. Mental health
3. Social health
4. Spiritual health
5. Emotional health
6. Socioeconomic health
7. Environmental health
8. Educational health nutritional health.

1. Physical health:

It is the perfect functioning of the body, i.e. a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of body.

The signs of physical health are:

- Good complexion, clear skin, bright eyes
- Lustrous hair with a body clothed with firm flesh, not too fat.
- Sweet breath, sound sleep
- Smooth, easy, coordinated body movements.
- Good appetite, regular activity of bowel and bladder
- All the organs of the body are of unexceptional size and function normally.

2. Mental health:

It is defined as a state of balance between the individual and surrounding world, a state of harmony between oneself and others, has self-esteem, self-confidence, self-control and has respect for others.

Characteristics:

- They feel good about themselves.

- They do not become overwhelmed by emotions, such as fear, anger, love, jealousy, guilt, or anxiety.
- They have lasting and satisfying personal relationships.
- They feel comfortable with other people.
- They can laugh at themselves and with others.
- They should be able to cope up with anxiety and stress, and so they are able to face the problems and solve them intelligently.
- They can accept life's disappointments.
- They make their own decisions.

3. Social health:

It is ability of an individual to adjust with the society. It implies harmony and integration within the individual, between each individual and other member of society and between individuals and the world in which they live.

Factors affecting social health are: Economic tension, poverty, illiteracy, unemployment and adverse social relations, etc.

Characteristics of social health are:

- Possession of social skills
- Proper social functioning within the community
- Ability of oneself to see as a member of the society.

4. Spiritual health:

It plays a role in health and disease. It refers to that part of the individual which reaches out and strives for meaning and purpose in life.

Spiritual health includes:

- Integrity
- Principles
- Ethics
- Commitment to some higher being.

5. Other: Emotional health, socioeconomic health, environmental health, educational health, nutritional health.

b. Give the long form of the following abbreviations: (i) BCG, (ii) DPT (iii) HIV

Ans:

i. **BCG:** Bacillus Calmett-Guerin
ii. **DPT:** Diptheria Pertussis Tetanus
iii. **HIV:** Human Immunodeficiency Virus

c. What is artificial ripening? Enlist the chemicals used for artificial ripening give ill-effects of it.

Ans: Artificial Ripening

Ripening is a physiological process that makes the fruit edible, pleasant and nutritious. Normally, fruits release ethylene gas, a plant hormone that causes the fruits to mature, when this natural ripening process is carried out by some artificial means it is known as artificial ripening.

Chemicals used for artificial ripening:

- Calcium carbide (CaC_2)
- Ethylene
- Ethephon
- Ethylene glycol.

Ill effects of Artificial Ripening:

1. ***Effect of calcium carbide:***

i. It is explosive in nature, and it breaks the natural structure of vitamins and other micronutrients.

ii. It creates only organoleptic changes, but fruit remains unripe from inside.

iii. It contains toxic chemicals such as traces of arsenic, lead particles and phosphorus which may lead to vomiting, diarrhoea, burning eyes, ulcers on the skin, etc.

iv. The acetylene released by calcium carbide has been found to be detrimental as it affects the neurological system and reduces oxygen supply to the brain and further induces prolonged hypoxia. It is hazardous to pregnant women and children and may lead to headaches, dizziness, mood disturbances, mental confusion, memory loss, cerebral oedema (swelling in the brain caused by excessive fluids), sleepiness, seizure, etc.

v. Consuming such artificially ripened mangoes could result in sleeping disorders, mouth ulcers, skin rashes, renal problems and possibly even cancer. Apart from this symptom of poisoning include diarrhoea (with or without blood), burning or tingling sensation in the abdomen and chest difficulty in swallowing, irritation in the eyes/skin, sore throat, cough, shortness in breathing, numbness, etc.

2. ***Effect of ethephon:*** Ethephon, a pesticide can have adverse effects on nervous system. It may lead to cancer, liver, kidney, and lung damage.

d. Enlist various arthropod-borne infections and give the causative agent and mode of transmission of dengue.

Ans: Arthropod borne diseases:

1. Dengue
2. Malaria
3. Filariasis
4. Chikungunya
5. Plague

Dengue:

- **Causative agent:** Dengue fever is an infection caused by four distinct serotype of dengue viruses (DENV-1, DENV-2, DENV-3 and DENV-4).
- **Mode of transmission of dengue:** Human to mosquito and mosquito to human transmission are the primary modes of transmission for dengue fever.
  - *Through mosquito bites:* Dengue viruses are spread to people through the bites of infected *Aedes* species mosquitoes.
  - *From mother to child:* A pregnant woman already infected with dengue can pass the virus to her foetus during pregnancy or around the time of birth.
  - *Through infected blood,* laboratory, or healthcare setting exposures—rarely, dengue can be spread through blood transfusion, organ transplant, or through a needle stick injury.

e. State what is meant by drug misuse and abuse. Also give prevention and control of drug misuse and abuse.

Ans: Drug Misuse:

Drug misuse refers to the use of a drug for purposes for which it is not intended or using drug in excessive quantities.

Drug Abuse: Excessive use of psychoactive drugs, such as alcohol, pain medications or illegal drugs which can lead to physical, social, or emotional harm.

Prevention and control of Drug Misuse and Abuse:

1. ***Effectively deal with peer pressure:*** The biggest reason teens start using illicit drugs is because their friends utilize peer pressure. In these cases, you need to either find a better group of friends that will not pressure you into doing harmful things, or you need to find a good way to say no.
2. ***Deal with life pressure:*** People today are overworked and overwhelmed and often feel like a good break or a reward is deserved. To prevent using drugs as a reward, find other ways to handle stress and unwind.
3. ***Seek help for mental illness:*** Mental illness and substance abuse often go together. Those with a mental health illness may turn to drugs to ease the pain. Those suffering from some form of mental health illness, such as anxiety, depression or post-traumatic stress disorder should seek the help of a trained professional for treatment before it leads to substance use.
4. ***Examine every risk factor:*** A history of substance abuse in the family, living in a social setting that glorifies drug abuse and/or family life that models drug abuse can be risk factors.
5. ***Keep a well-balanced life:*** People take up drugs when something in their life is not working, or when they are unhappy about their lives or where their lives are going. Look at life's big picture and have priorities in order.
6. ***Education:*** Drug abuse prevention begins with education, spreading the word regarding the dangers of drugs to oneself and to the community. Drug prevention programs seek to involve the family, community, or workplace in the prevention process. To be effective, communities need to sustain the progress. This often requires continued leadership and financial support.

Programs for Drug Prevention

1. **Family-based drug prevention:** The prevention of drug abuse should start inside the family unit as early as possible.

   This includes creating an effective system of monitoring their children's activities.
2. **School-based drug abuse prevention programs:** Drug abuse prevention should be addressed as early as preschool. Preschool children can benefit from learning how to handle aggression, solve problems, and communicate better so that

they can avoid putting themselves at risk for drug abuse later in life. Middle and high school programs should focus on peer relationships, communication, assertiveness, drug resistance skills and developing anti-drug attitudes. School based prevention programs should be repeated often for the best level of success.

3. **Community-based drug abuse prevention programs:** Communities that try to come together in the fight against drugs are sure to make an impact in the prevention of drug abuse.

f. Explain the role of pharmacist in National Health programmes.

Ans: Role of pharmacist in National Health programmes

1. Early detection and prompt referral for treatment by; Identifying symptomatic cases, referring to diagnostic centers, drug distribution centers (DDC), fever treatment depots (FTDs), etc.
2. Ensuring rational use of prescribed medicines.
3. Sensitizing people about various vector control measures.
4. Counselling to the patients, providing consumer health information.
3. In the case of TB easy access for patients to the government's free anti-TB medicines, i.e. DOTS.
4. Early identification of TB suspects, avoiding diagnostic delays.
5. Pharmacists should be involved in the procurement, storage and distribution of quality medicines.
6. They can monitor ARV therapy and ensure the proper use of medicines.
7. Pharmacists can get involved in various HIV prevention programs of NACO like; blood safety, STD control, condom promotion, IEC and social mobilization, care, support and treatment of patient living.
8. Spreading the message of the small family norm and its advantages.
9. Providing a reservoir of knowledge on family planning methods.
10. Distributing family planning literature freely so that the customer can carry it home.
11. By having access to medicinal records, the pharmacists are in a position to influence the selection of medicines,

and dosage regimens, monitor patient compliance and therapeutics, and recognize and report adverse drug reactions (pharmacovigilance).

12. Counselling patient sensitizing and creating awareness among the public through carrying out seminars, exhibitions, consumer awareness programs, etc. patient information, and counselling on de-addiction services.

g. Define microbiology and give the classification of bacteria depending on shape.

Ans: Microbiology:

It is the study of microorganisms with respect to their cytology, physiology, reproduction and useful activities or harms caused. Microbiology is the study of microscopic organisms.

It is derived from three Greek words—*mikros* ("small"), *bios* ("life") and *logos* (science")

Classification: Bacteria are classified based on their shapes as:

1. Cocci—bacteria spherical or round
2. Bacilli—rod shaped bacteria
3. Spirilla—rigid spiral or spring shaped bacteria
4. Vibrios—comma shaped bacteria
5. Spirochaetes—spirochaetes
6. Actinomycetes—branching filamentous bacteria.
7. Mycoplasmas—round or oval bodies as they lack cell wall. So shape is not fixed.

h. State what is balanced diet? Enlist various ill effects of junk foods.

Ans: Balanced diet:

A diet which contains proper amount of calorie, vitamins and minerals needed to keep a person healthy is referred to as balanced diet.

Balance diet contains adequate amounts of all nutrients namely:

- Carbohydrates (50%)
- Proteins (35%)
- Fats (12%)
- Minerals (03%)
- Vitamins and sufficient water.

Ill effects of junk food:

1. Excess consumption of junk foods leads to inadequate growth and development of the body.
2. Junk foods contribute to an increased risk of obesity, diabetes, cardiovascular disease, and many other chronic health conditions.
3. High intake of junk foods tends to suppress the function of the brain that helps in learning and memory formation.
4. One of the bad effects of junk food is overeating. It may lead to loss of appetite and problems in digestion.
5. Junk food has a negative impact on energy level and emotional well-being.
6. Junk food also has a mental impact which leads to mental depressions.

i. Define the term "Pharmacoeconomics".

Ans: Pharmacoeconomics:

- Field of study that evaluates the behaviours of individuals, firms and markets relevant to use of pharmaceutical products, services and programs, and which frequently focuses on the costs and consequences of that use.
- It is defined as the analysis of the cost of drug therapy to healthcare system and society.
- It is a sub-discipline of health economics.
- A pharmacoeconomics study evaluates the cost (expressed in monetary terms) and effects (expressed in terms of monetary value, efficacy, or enhanced quality of life) of a pharmaceutical product.
- Pharmacoeconomics studies serve to guide optimal healthcare resource allocation, in a standardized and scientifically grounded manner.
- Pharmacoeconomics refers to the scientific discipline that compares the value of one pharmaceutical drug or drug therapy to another.
- Pharmacoeconomics analysis helps in determining the cost impact of innovative treatments and helps in granting more recognition by healthcare providers, policy makers and public.

j. Explain what is noise pollution? Give the sources and control measures of noise pollution.

Ans: Noise Pollution

Noise is defined as unwanted sound or wrong sound at wrong place at wrong time. Noise Pollution is an excessive and annoying degree of noise in a particular area.

Sources of noise pollution:

1. The industrial source includes the noise from various industries and big machines working at a very high speed and high noise intensity.
2. Noise pollution can come from outdoor sources, such as road traffic, jet planes, garbage trucks, construction equipment.
3. Some of the main sources of noise in residential areas include loud music, transportation (traffic, rail, airplanes, etc.), lawn care maintenance, construction, electrical generators, wind turbines, explosions, etc.

Control measures of noise pollution:

1. **Control of noise at source:** It can be achieved by segregating noisy machines and by using mufflers or other noise reducers to machines.
2. **Control of transmission:** This can be achieved by building enclosures and covering walls with sound absorbing material.
3. **Protection of exposed persons:** It is recommended for all workers who are consistently exposed to noise louder than 85 dB in the frequency band above 150 Hz. Periodical audiogram check-ups, use of ear plugs, ear-muffs is also essential.
4. **Education:** Education of people through available media is required to highlight the importance of noise as a community hazards.

k. State the causative agent and mode of transmission of:

i. Whooping cough
ii. Poliomyelitis
iii. Tetanus

Ans: i. Whooping cough

- Causative agent: It is an infectious disease caused by *Bordetella pertussis.*
- Mode of transmission:

The source of infection is infected patient. The disease spreads by droplet infection and through fomites.

ii. Poliomyelitis
- Causative agent:

Poliomyelitis virus serotypes I or II or III.
- Modes of Transmission:
  - Main transmission is through faeco-oral route.
  - Another route is the droplet infection, this occurs in the acute phase of disease when the virus occurs in the throat. Close personal contact with an infected person facilitates droplet infection.

iii. Tetanus
- Causative agent: *Clostridium tetani*
- Modes of transmission:
  - Main transmission is through contamination of wounds by tetanus spores.
  - The injuries that can cause tetanus are pin prick, abrasion, puncture wound, burn, human bite, animal bite, stings, unsterile injections or surgical instruments, compound fractures, etc.

Q3. Answer ALL questions of the following. 20 Marks

a. First National Health Policy was launched in the year _____

(i) 1980 (ii) 1988
(iii) 1983 (iv) 1990

Ans: (iii) 1983

b. _____ is a permanent sterilization surgery meant for men.

(i) Tubectomy (ii) Gastrectomy
(iii) Anatomy (iv) Vasectomy

Ans: (iv) Vasectomy

c. The causative agent of chickenpox is _____

(i) Varicella zoster (ii) Bordetella pertusis
(iii) Vibrio cholerae (iv) Ebola virus

Ans: (i) Varicella zoster

d. Kwashiorkor and marasmus are deficiency disease of _____

(i) Carbohydrates (ii) Proteins
(iii) Lipids (iv) Waxes

Ans: (ii) Proteins

e. _____ programme was initiated by the Government of India during 7th five-year plan in 1987.

(i) Calcium deficiency (ii) Potassium deficiency
(iii) Iodine deficiency (iv) Sodium deficiency

Ans: (iii) Iodine deficiency

f. The chief reason for using _____ is to define monetary value of a saving human life.

(i) Cost effectiveness (ii) Cost benefit analysis
(iii) Direct cost (iv) Cost treatment

Ans: (ii) Cost-benefits analysis

g. Bacteria that appears violet in colour after the staining process is _____

(i) Gram-negative bacteria
(ii) Gram-positive bacteria
(iii) Both i and ii
(iv) None of these

Ans: (ii) Gram-positive bacteria

h. The breast-feeding awareness week is celebrated by WHO on _____

(i) 1st week of August, every year
(ii) 2nd week of September, every year
(iii) 1st week of July, every year
(iv) 2nd week of October, every year

Ans: (i) First week of August, every year

i. FIP consists of _____ board.

(i) Board of pharmaceutical sciences
(ii) Board of chemistry
(iii) Board of microbial sciences
(iv) None of these

Ans: (i) Board of pharmaceutical sciences.

j. The headquarter of "National AIDS Control Organization" (NACO) located in _____

(i) Lucknow (ii) New Delhi
(iii) Kolkatta (iv) Izzatnagar

Ans: (ii) New Delhi

k. Antibiotic-tetracycline shows food interaction with _____

(i) Minerals (ii) Cold drinks
(iii) Liquors (iv) Dairy products

Ans: (iv) Dairy products

l. Neutral spirit contains _____ alcohol by volume.

(i) 45–50% (ii) 55–60%
(iii) 90–95% (iv) 60–70%

Ans: (iii) 90–95%

m. Incubation period of leprosy is _____

(i) 7–12 years (ii) 8–10 years
(iii) 10–12 years (iv) 2–5 years

Ans: (iv) 2–5 years

n. Sustainable Development Goals (SDGs) adopted by the United Nations has_____number of goals.

(i) 17 (ii) 16
(iii) 15 (iv) 14

Ans: (i) 17

o. NPCDCS stands for: National Programme for Prevention and Control of _____

(i) Cancer, Diabetes, Cardiovascular Diseases and Stroke
(ii) Cancer, Dipolpia, Cardiovascular Diseases and Stroke
(iii) Cancer, Diabetes, Cardiovascular Diseases and Stupor
(iv) Cancer, Depression, Cardiovascular Diseases and Stroke

Ans: (i) Cancer, Diabetes, Cardiovascular diseases and Stroke

p. Risk of illness or accidents in the workplace is known as _____ hazards.

(i) Family (ii) Occupational
(iii) Social (iv) Environmental

Ans: (ii) Occupational

q. IEC stand for_____

(i) Information, Education and Communication
(ii) Information, Economy and Communication
(iii) Information, Enquiry and Communication
(iv) Information, Education and Cooperation

Ans: (i) Information, Education and Communication

r. An ideal health indicator should be_____

(i) Valid (ii) Reliable
(iii) Sensitive (iv) All of the above

Ans: (iv) All of the above

s. The objectives of National Mental Health Programme (NMHP) are ____

(i) To improve environmental sanitation
(ii) To improve rural health
(iii) To encourage the application of mental health knowledge in general healthcare and social development.
(iv) To promote Healthy life styles

Ans: (iii) To encourage the application of mental health knowledge in general healthcare and in social development

t. *Entamoeba histolytica* is the causative agent of _____

(i) Helminthiasis (ii) Giardiasis
(iii) Tineasis (iv) Amoebiasis

Ans: (iv) Amoebiasis

Summer Examination 2023
(Question Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Answer any SIX of the following: **30 Marks**

a. Give the definition and scope of social pharmacy. What is the role of pharmacist in public health?
b. Define family planning. Write in brief about various contraceptive methods.
c. Define the term epidemiology. Enlist and explain different types of epidemiology.
d. (i) Discuss various solid waste disposal methods.
   (ii) What is sewage?
e. (i) Describe any one National Health Program for mother and child.
   (ii) What is Pradhan Mantri Jan Arogya Yojana (PM-JAY)?
f. Describe causative agent, clinical presentation, and role of pharmacist in prevention of tuberculosis.
g. Give causative agent and clinical presentation for following infections (any two)
   (i) Dengue (ii) Covid-19
   (iii) Typhoid

Q2. Answer any TEN of the following: **30 Marks**

a. Differentiate between prokaryotic and eukaryotic microorganisms.
b. What are FIP developments goals? When was it launched?
c. Define noise. Write about ill effects of noise pollution on health.
d. Write various causes of pharmaceutical pollution.
e. Discuss types and importance of fibres in diet.
f. State what is food safety? What are nutraceuticals?
g. State objective of National Health Program of prevention and control of cancer
h. Write note on Gram staining of bacteria.
i. Write note on pharmacoeconomics.

j. State the causative agent and mode of transmission of:
   (i) Malaria (ii) Cholera
k. Define: Epidemic, pandemic and endemic

Q3. Attempt all questions of the following. 20 Marks

a. The International Pharmaceutical Federation was founded in year _____
b. Write full form of MDG.
c. Health is a state of complete _____, mental and social well-being and not merely the absence of disease.
d. The National Health Mission was launched in year____
e. Define the term demography.
f. Breastfeeding awareness week is celebrated in month of _____
g. Give two examples of psychotropic substances.
h. Write one common cause of air pollution.
i. Kwashiorkor develops due to deficiency of _____
j. The practice of adding vitamins and minerals to food during processing to increase its nutritional value is known as ____
k. Filariasis is caused by _____
l. Following are examples of respiratory tract infections, *except* ___
m. The causative organism for plague is_____
n. Write full form of MERS.
o. What do you mean by mortality?
p. Write full form of WHO.
q. Give one example of any one National Health Programme focused on nutrition.
r. First National Health Policy was launched by Government of India in year ___
s. In which year National Health Programme on Mental Health was launched?
t. What is the measure of quality of life in different disease states?

Summer Examination 2023
(Specimen Answer Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Answer any SIX of the following: **30 Marks**

a. Give the definition and scope of Social Pharmacy. What is the role of pharmacist in public health?

Ans: Social Pharmacy

Social pharmacy can be defined as the branch of science that deals with the scientific studies of treatment, monitoring tools, patient behavior and its impact on patient health. OR

Social pharmacy is a science which deals with social aspects of the profession of pharmacy.

Scope of Social Pharmacy:

1. Social pharmacy is the multidisciplinary field of education and research that focuses on the role, provision, regulation, and use of medicines in society.
2. The scope is broad, covering medicines' social, psycho-social, economic, and organizational aspects.
3. Social pharmacy has played an important role in training programs for community-based pharmacists essential for a hyper-aged society, for community pharmacies' health management programs aimed at promoting the health of residents, and educational programs for elementary and middle school children.
4. The primary pursuit of social pharmacy research is to investigate questions and themes concerning pharmacy practice and medicine use.
5. It is a hybrid field that uses theories and methods from numerous humanistic and social scientific disciplines in order to explore all aspects of pharmacy practice.
6. Research in social pharmacy can help to study the important opportunities and challenges facing clinical pharmacy within

healthcare. If this understanding is lacking, it makes research of clinical pharmacy services within healthcare difficult.

Role of Pharmacists in Public Health: Pharmacists play an important role in promoting public health and improving patient outcomes. Some of the key responsibilities of pharmacists in public health include:

1. Pharmacists work with patients to ensure that they are taking their medications safely and effectively.
2. They also help to manage drug interactions and side effects, and work with patients to optimize their medication regimen.
3. Pharmacists are trained to help patients manage chronic conditions, such as diabetes, heart disease, and hypertension.
4. They can provide education on healthy lifestyle habits, such as diet and exercise and monitor patients' progress.
5. Pharmacists can play an important role in promoting immunization and increasing vaccination rates.
6. They can educate patients about the importance of vaccines and administer vaccines in a safe and effective manner.
7. Pharmacists can screen patients for various health conditions, such as high blood pressure and high cholesterol, and provide education on ways to prevent these conditions.
8. Pharmacists can participate in public health initiatives, such as health fairs and disease screening programs, to improve the health of the community.
9. Pharmacists work closely with other healthcare professionals, such as doctors and nurses, to provide comprehensive care to patients.
10. They also collaborate with public health agencies and other organizations to address public health concerns.

b. Define Family Planning. Write in brief about various contraceptive methods.

Ans: Familiy Planning

Family planning (according to WHO in 1971) is defined as "the way of living and thinking that is adopted voluntarily, upon the basis of knowledge, attitudes and responsible decisions

by individuals and couples in order to promote the health and welfare of the family and thus contributes effectively to the social development of a country."

Methods of contraception: Following are the methods of contraception.

A. Temporary Methods

a. Barrier methods:

i. Physical methods: (i) Condom, (ii) Diaphragm, (iii) Vaginal sponge

ii. Chemical methods: (i) Foams, (ii) Creams, (iii) Suppositories, (iv) Soluble films

b. Intrauterine devices (IUDs):

i. First generation non-medicated IUDs: Loops as Lippes loop

ii. Second generation medicated IUDs: Metal containing IUDs: Copper-7, Copper T-200, T. Cu-380 A or Ag

iii. Third generation hormone containing IUDs: Progestasert

c. Hormonal methods:

i. Hormonal pills: Combined pill: Mala-N, Mala-D Progestogen only pill (POP)

Post-coital pill: Tab.Unwanted-72, Tab. I-pill-72, once a month pill, male pill Saheli (centchroman)

ii. Slow-release preparations:

Injectable: DMPA (Depot-medroxyprogesterone acetate) and NET-EN (norethisterone enanthate)

Subcutaneous implants: Norplant vaginal rings

d. Postconceptional methods:

i. Menstrual regulation

ii. Menstrual induction

iii. Abortion (MTP)

B. Permanent Methods:

a. Male sterilization (vasectomy)

b. Female sterilization (tubectomy).

C. Miscellaneous Methods:

a. Behavioural methods

i. Abstinence

ii. Coitus interruptus

iii. Safe period use method
iv. Vaginal washing method

b. Natural family planning method

i. Basal body temperature
ii. Cervical mucus method/Billing's method
iii. Prolonged lactation method/LAM method (lactational amenorrhea)
iv. Symptothermal method.

Each of the contraceptive methods have their own advantages and disadvantages, so the adoption of a particular method amongst the given is purely a matter of individual couples preference.

c. Define the term epidemiology. Enlist and explain different types of epidemiology.

Ans: Epidemology

Epidemiology is the study of the distribution and determinants of health-related events and diseases in the population and the application of knowledge to control health problems.

The different epidemiological methods are as follows:

1. Descriptive epidemiology
2. Analytical epidemiology
3. Experimental epidemiology.

1. Descriptive epidemiology:

Descriptive studies are concerned with the distribution of disease or health related characteristics in human populations and identifying the characteristics with which the disease in question appears to be associated, i.e. time of the disease occurrence, place where the disease is occurring and who is affected by the disease (population). The time distribution means the study of, "when does the disease occur? For example, water borne gastrointestinal infections occur more frequently during summer season. In place distribution we can study the occurrence of diseases in a particular geographical area.

There may be difference in occurrence between villages, cities, states, countries. Guinea worms are more common in Rajasthan than in Jammu and Kashmir. Person distribution indicates the persons who get the disease more frequently, e.g. whooping cough is common in children.

2. The analytical studies:

These comprise two distinct types of observational studies.

A. Case control study
B. Cohort study

A. Case Control Study

- Retrospective study
- From effect to the cause
- Studying the disease and see if you can associate risk factors to it.

B. Cohort Study

- Prospective study
- From cause to the effect
- Studying the risk factor to see if disease is associated with it.

From both these study designs one can determine whether a statistically significant association exists between, a disease and a suspected factor and if one exists, the strength of association.

3. Experimental epidemiology

The aims of experimental studies are as follows:

- To provide scientific proof of etiological or risk factors which may permit the modification or control of those diseases.
- To provide a method of measuring the effectiveness and efficiency of health services for the prevention, control and treatment of disease and improve the health of the community.
- The experimental studies can be conducted in animals or human beings.

d (i) Discuss various solid waste disposal methods. What is sewage?

Ans: Solid waste disposal methods

Solid waste is disposed of by using following methods.

1. Dumping
2. Controlled tipping or sanitary landfill
3. Burning
4. Composting
5. Burial

1. Dumping: Dry refuse is mainly dumped in low lying areas which help not only in disposal but also in reclamation of land. By the action of bacteria, the volume of the refuse decreases

considerably in volume and is converted gradually into humus. It is not an ideal method.

2. **Controlled tipping or sanitary landfill:** This is the most satisfactory method of refuse disposal. In this method a trench is dug. The refuse is compactly dumped in these pits and at the end of each working day is covered with earth, when the trench is full; again, it is covered with earth and is compacted. In this method the chemical and bacteriological processes decompose the refuse into simple substances with generation of heat.
3. **Burning:** Refuse can be disposed of hygienically by burning. Hospital refuse which is particularly dangerous is best disposed of by burning.
4. **Composting:** It is a method of combined disposal of refuse and night soil. The basic principle is, when the refuse and night soil (excreta) are dumped in a pit and covered with earth there is anaerobic decomposition. The heat produced during decomposition kills the organisms and ultimately, we get compost, which is used as manure.
5. **Burial:** It is useful for small scale disposal like camps. In a small trench or pit the refuse is collected and at the end of each day it is covered with 20–30 cm of earth. The contents of the pit may be taken out after 4–6 months and used on the fields.

(ii) What is sewage?

Ans: Sewage: Sewage is wastewater which contains decomposable organic matter and pathogenic microorganisms.

Sewage Treatment Plant

A major component of this wastewater is human excreta. This municipal wastewater is also called sewage. It contains large amounts of organic matter and microbes. Many of which are pathogenic. Before disposal, sewage is treated in sewage treatment plants (STPs) to make it less polluting. Treatment of wastewater is done by the heterotrophic microbes naturally present in the sewage. This treatment is carried out in two stages.

1. **Primary treatment:** These treatment steps basically involve physical removal of particles large and small from the sewage through filtration and sedimentation. Initially, floating debris is removed by sequential filtration. Then the grit (soil and small pebbles) is removed by sedimentation. All solids that

settle form the primary sludge, and the supernatant forms the effluent.

2. **Secondary treatment or biological treatment:** The primary effluent is passed into large aeration tanks where it is constantly agitated mechanically, and air is pumped into it. This allows vigorous growth of useful aerobic microbes into flocs (masses of bacteria associated with fungal filaments to form mesh like structures). While growing, these microbes consume a major part of the organic matter in the effluent. This significantly reduces the BOD (biochemical oxygen demand) of the effluent.

   BOD refers to the amount of oxygen that would be consumed if all the organic matter in one liter of water were oxidized by bacteria. The sewage water is treated till the BOD is reduced. The greater the BOD of wastewater, the more is its polluting potential. Once the BOD of sewage or wastewater is reduced significantly, the effluent is then passed into a settling tank where the bacterial 'flocs' are allowed to sediment. This sediment is called activated sludge. A small part of the activated sludge is pumped back into the aeration tank to serve as the inoculum.

   The remaining major part of the sludge is pumped into large tanks called anaerobic sludge digesters. Here, other kinds of bacteria, which grow anaerobically, digest the bacteria and the fungi in the sludge. The effluent from the secondary treatment plant is generally released into natural water bodies like rivers and streams.

e (i) Describe any one National Health Program for mother and child.

Ans: Various programs for mother and child care are as follows:

- Janani Shishu Suraksha Karyakram
- Janani Suraksha Yojana
- Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)

Janani Shishu Suraksha Karyakram: Institutional deliveries in India increased substantially after launched of Janani Suraksha Yojana (JSY). However, 25% women still hesitate to access health facilities for delivery due to out of pocket expenditure during stay at health facilities on drugs, diet, and diagnosis and arrangement blood, etc. Building on the progress of this safe motherhood scheme, another major initiative.

Janani Shishu Suraksha Karyakaram (JSSK) was launched in June 2011 to eliminate out-of-pocket expenses for both pregnant women and sick infants.

Essential care is provided to the mother and her neonate within 48 hours. This postnatal period is critical for identification and management of complication of post-delivery.

In the case of institutional delivery, accessing this care is a little easier. Reasons like high out of pocket expenditure on diagnostics/investigations, blood, drugs, food and user charges institutional delivery JSSK was launched in June 2011 to eliminate out-of-pocket expenses for institutional delivery of pregnant women and treatment of sick infants.

In 2014, the programme was extended to all antenatal and postnatal complications of pregnancy and similar entitlements have been put in place for all sick newborns and infants (up to one year of age) accessing public health institutions for treatment.

Janani Suraksha Yojana:

Janani Suraksha Yojana (JSY) is a safe motherhood intervention under the National Health Mission. It is being implemented with the objective of reducing maternal and neonatal mortality by promoting institutional delivery among poor pregnant women.

The scheme, launched on 12th April 2005 by the Hon'ble Prime Minister, is under implementation in all states and Union Territories (UTs), with a special focus on Low Performing States (LPS). JSY is a centrally sponsored scheme, which integrates cash assistance with delivery and post-delivery care.

The scheme focuses on poor pregnant woman with a special dispensation for states that have low institutional delivery rates, namely, the states of Uttar Pradesh, Uttarakhand, Bihar, Jharkhand, Madhya Pradesh, Chhattisgarh, Assam, Rajasthan, Odisha, and Jammu and Kashmir. While these states have been named Low performing states (LPS), the remaining states have been named high performing states (HPS).

(ii) What is Pradhan Mantri Jan Arogya Yojana (PM- JAY)?

Ans: Pradhan Mantri Jan Arogya Yojana: PMJAY or Ayushman Bharat

1. Ayushman Bharat PM-JAY is the largest health assurance scheme in the world which aims at providing a health cover of ₹ 5 lakhs per family per year for secondary and tertiary care

hospitalization to over 12 crores poor and vulnerable families (approximately 55 crore beneficiaries) that form the bottom 40% of the Indian population.
2. PM-JAY provides cashless access to healthcare services for the beneficiary at the point of service, that is, the hospital.
3. It covers up to 3 days of pre-hospitalization and 15 days post-hospitalization expenses such as diagnostics and medicines.
4. The scheme aims to target the poor and vulnerable population of the country, based on the Socio Economic and Caste Census 2011 (SECC) database. There will be no cap on family size and age in the scheme.
5. There is no restriction on family size, age or gender.
6. Benefits of the scheme are portable across the country, i.e. a beneficiary can visit any empanelled public or private hospital in India to avail cashless treatment.
7. The payment for treatment will be made at a package rate which will be defined by the Government on an advanced basis. The package rates will include all the costs associated with treatment. The states and UTs will have the flexibility to modify these rates within a limited bandwidth.
8. The scheme will work in partnership with NITI Aayog to operationalize a robust, modular, and interoperable IT platform which will involve a paperless and cashless transaction.
9. The National Health Agency (NHA), the apex body implementing the scheme, has launched a website (mera.pmjay.gov.in).

f. Describe causative agent, clinical presentation, and role of pharmacist in prevention of tuberculosis.

Ans: Tuberculosis

Causative agent: Tuberculosis (TB) is caused by a bacterium, called *Mycobacterium tuberculosis*.

Clinical Presentation:

a. Persistent cough for more than two weeks
b. Fever
c. Weakness
d. Unintentional weight loss
e. Loss of appetite.
f. Chest pain

g. Blood in sputum.
h. Fatigue
i. Night sweats: Profuse sweating, especially at night.
j. Chills

Role of pharmacists in prevention of tuberculosis:

a. Pharmacists can play an important role in vaccination program by counselling people regarding getting themselves vaccinated with the BCG vaccine and proper follow up.
b. Pharmacists can help public to understand the dangers of tuberculosis and guide them to prevent their occurrence in the community.
c. Pharmacists can counsel people about the importance of completing the entire course of treatment prescribed by the physician to avoid the reinfection of the disease by the pathogen and drug resistance development.
d. Pharmacists can guide the community regarding the importance of hand washing, sanitation, cough/sneezing etiquettes, personal hygiene, nutrition and thereby help in the prevention of tuberculosis.
e. Provide drug related information and consulting to patients and healthcare professionals.
f. Educating the healthcare professionals like doctors about the issues related to drug use process.
g. Pharmacists can help prevent medical errors by increasing patient health literacy.
h. Pharmacists can also educate the people about the harmful effects of smoking and the increased risk of respiratory diseases in smokers.

g. Give causative agent and clinical presentation for following infections (any two)

(i) Dengue
(ii) Covid-19
(iii) Typhoid

Ans: (i) Dengue:

Causative agent: The dengue viruses (DENV-1,2,3 and 4) are the causative agents of dengue fever that are enveloped single positive stranded RNA viruses belonging to the Flaviviridae family.

Clinical Presentation:

i. Mild Dengue Fever:

1. High fever.
2. Body rash.
3. Vomiting and feeling nauseous.
4. Muscle, bone, or joint pain.
5. Pain behind the eyes.
6. Headache.

ii. Severe Dengue Haemorrhagic Fever (DHF)/Dengue Shock Syndrome (DSS)

1. Small blood spots under the skin.
2. Intense stomach pain.
3. Persistent vomiting.
4. Internal bleeding, leading to blood vomit, faeces or urine.
5. Weak pulse.
6. Bleeding from the mouth, gums, or nose.

iii. Covid-19:

Causative agent: The causative agent for COVID-19 is a novel coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Clinical Presentation:

i. Most common symptoms:

1. Fever or chills
2. Cough
3. Muscle or body aches
4. Anorexia
5. Sore throat
6. Nasal congestion or runny nose
7. Headache
8. Diarrhoea
9. Nausea
10. Shortness of breath or difficulty breathing
11. Loss of smell or taste

ii. Serious symptoms:

1. Difficulty breathing or shortness of breath, loss of speech or mobility, or confusion.
2. Chest pain.

iii. Typhoid:
Causative agent: Salmonella typhi

Clinical Presentations:

i. Prolonged high fever.
ii. Abdominal pain.
iii. Headache.
iv. Diarrhoea or constipation.
v. Rash.
vi. Loss of appetite and weight loss.
vii. Nausea.
viii. Weakness and fatigue.

Q2. Answer any TEN of the following: 30 Marks

a. Differentiate between prokaryotic and eukaryotic microorganisms.

Ans:

Parameter	*Prokaryotic cells*	*Eukaryotic cells*
Membrane-Bound organelles	Absent	Present
Nucleus	There is the absence of a well-defined nucleus. Furthermore, there is the presence of nucleoid here which is an open region that contains DNA	There is certainly the presence of a well-defined nucleus here. Furthermore, a nuclear membrane encloses it
Cell size	The cell size is smaller (0.1–5 μm)	The cell size is larger (10–100 μm) in contrast
Cell structure	Unicellular structure	Most eukaryotic cells are multicellular. However, some are unicellular
DNA form	They have a circular DNA form	They have a linear DNA form
Complexity	Simpler	More complex in comparison to prokaryotic cells
Cell wall	The cell wall is present here. Furthermore, it comprises mucopeptide or peptidoglycan	Usually, there is an absence of cell wall here. However, in case it is present, it comprises cellulose
Mitochondria	Absent	Present
Ribosome	70S	80S

Shape of DNA	Double-stranded circular DNA	Double-stranded linear DNA
Golgi apparatus	Absent	Present
Mode of reproduction	Asexual	Sexual reproduction is certainly the most common here
Endoplasmic reticulum	Absent	Present

b. What are FIP Developments Goals? When was it launched?

Ans: FIP Development Goals:

- International Pharmaceutical Federation (FIP) has set targets to meet national, regional, and global healthcare needs. The FIP Development Goals is a well-designed time bound initiative for pharmacy and its contribution to world health.
- The FIP goals aim at:
  - Assessing and prioritizing national health situations.
  - Educating and developing the workforce.
  - Ensuring good practices.
  - Promoting pharmaceutical innovations.
- There are 21 goals decided as core dimensions of FIP's mission to ensure and promote practice, science, and education in pharmacy.
- FIP Development Goals are the systematic and integrated approach to meet support objectives of the UN program "Health For All" through the development of the pharmaceutical workforce.

Goal 1: Academic capacity.
Goal 2: Early career training strategy development.
Goal 3: Quality assurance.
Goal 4: Advanced and specialist development.
Goal 5: Competency development.
Goal 6: Leadership development.
Goal 7: Advancing integrated services.
Goal 8: Working with others.
Goal 9: Continuing professional development strategies
Goal 10: Equity and equality
Goal 11: Impact and outcomes
Goal 12: Pharmacy intelligence.

Goal 13: Policy development
Goal 14: Medicines experts.
Goal 15: People-centred care
Goal 16: Communicable diseases.
Goal 17: Antimicrobial stewardship.
Goal 18: Access to medicines, devices and services.
Goal 19: Patient safety
Goal 20: Digital health.
Goal 21: Sustainability in pharmacy
The FIP Development Goals launched in September 2020.

c. Define Noise. Write about ill effects of noise pollution on health.

Ans: Noise: Noise is defined as unwanted sound or wrong sound at wrong place at wrong time.

Ill effects of noise:

1. ***Auditory Effects:***
   a. Auditory fatigue decreased hearing ability.
   b. Deafness which may be temporary or permanent.
2. ***Non-auditory effects:***
   a. Speech interferences due to noise produced by air traffic, industry, etc.
   b. Anger, irritability which is a psychological response.
   c. Lack of mental concentration decreased efficiency.
   d. Physiological changes like rise in blood pressure heart rate, respiratory rate.
   e. Headache, giddiness, nausea, fatigue, insomnia

d. Write various causes of pharmaceutical pollution.

Ans: Causes of pharmaceutical pollution

1. **The drugs use and how they are ingested and expelled:** Our bodies metabolize only a fraction of most of the drugs we swallow. The remaining part can be sweated out, but the large part is excreted from the body through urine or faecal matter, meaning the excreta will be part of the wastewater and eventually will be in the environment.

   Some medication can also be applied as creams or lotions and the unabsorbed portions of the medication will be washed off the body and find its way into the environment.

2. **Healthcare institutions:** Hospitals and nursing homes also contribute to pharmaceutical pollution. Hospitals might be less of a problem as they have on-site pharmacies with arrangements to return the unused drugs to the manufacturers for credit or disposal. Nursing homes, on the other hand, are particularly guilty of flushing medications down the toilet or drain, especially if a patient dies or is transferred to another facility, mainly because in most cases, they do not have a similar return policy with drug manufacturers as hospitals.
3. **Drug manufacturers:** Although some factories are bigger than others, they are all guilty of contributing to pharmaceutical pollution. Some will dispose of the drugs in a landfill, and some will flush them, among many other ways of disposing of the drugs.
4. **Agriculture and agro products:** Like humans, not all the drugs fed to domesticated animals are metabolized by their bodies. For this reason, they excrete parts of the drugs that remain undigested. The drugs and hormones were meant to make the livestock and poultry grow faster as well as keeping them from getting sick. As such, and inevitably, some of those hormones and antibiotics will leach into groundwater or get into water ways and contribute to pharmaceutical pollution.
5. **Human domestic drug use and disposal behaviour:** We as consumers are responsible for a significant amount of the pharmaceutical and personal care products that end up in streams, groundwater, lakes, and rivers. It is not uncommon to find a home cabinet full of unused and expired drugs. The problem is that out of all these drugs, only a fraction is disposed of properly.

e. Discuss types and importance of fibres in diet.

Ans: Types of fibres:

1. Soluble fibre
2. Insoluble fibre

1. **Soluble fibre:** Soluble fibre is a chemical constituent of plant cell walls, which are non-cellulosic polysaccharides, oligosaccharides, pectins, p-glucans, and gums. Soluble fibre is found in foods like fruit, oats, beans, and barley. When it dissolves in water it forms a gel-like substance.

2. **Insoluble fibre:** Insoluble fibre is a chemical constituent of plant cell walls, which are cellulose, hemicellulose, lignin. insoluble fibre does not dissolve in water and is found in foods like whole meal bread, wheat bran, vegetables, and nuts.

Importance of fibres

1. Help in digestion—fibres play an important role in the digestion by providing the support to the food material. In the intestine food material are combine with the fibrous material and easily pass out through the anal/rectal region.
2. Maintain the cholesterol level—in our body cholesterol are not easily pass out from the body but due to involvement of fibres unwanted cholesterol are ligate with the fibre and easily excrete from the body.
3. Maintain the blood sugar level—by helping in the digestion process fibres allow the essential substances absorption and removal so it regulates the blood sugar level.
4. Prevention in GIT infections—some time indigestion, constipation and disturb digestion, cause the infections in the GIT. For the treatment of these conditions doctor are recommending taking of more fibres fruit or vegetable. Fibres are also preventing the severe problems like piles.

f. State what is food safety? What are Nutraceuticals?

Ans:

1. **Food safety:** Food safety involves the procedures followed at the time of preparation, handling, and storage of the food to prevent food-borne illness.
2. **Nutraceuticals:**
   - They are defined as a substance which has physiological benefits or provide protection against chronic disease.
   - Nutraceuticals are products, which other than nutrition are also used as medicine.
   - It used to improve health prevent chronic disease and increase life expectancy.
   - The products are isolated from herbal products, dietary supplements (nutrients) specific diets.
   - Nutraceutical products can be considered non-specific biological therapies used to promote general well-being, control symptoms, and prevent malignant processes.

- The term "nutraceutical" combines the two words of "nutrient," which is a nourishing food component, and "pharmaceutical," which is a medical drug. The name was coined in 1989 by Stephen De Felice, founder and chairman of the foundation for innovation in medicine, which is an American organization located in Cranford, New Jersey.
- Nutraceuticals include dietary fiber, polyunsaturated fatty acids (PUFA, fish oil), proteins, peptides, amino acids, keto-acids, minerals, antioxidant vitamins, etc.

g. State objective of National Health Program of Prevention and Control of Cancer

Ans: National Health Program of Prevention and Control of Cancer

1. Health promotion through behaviour change with involvement of community, civil society, community-based organizations, media, etc.
2. Opportunistic screening at all levels in the healthcare delivery system from subcentre and above for early detection of diabetes, hypertension, and common cancers.
3. Outreach camps are also envisaged: To prevent and control chronic non-communicable diseases (NCD), especially cancer, diabetes, CVDs and stroke.
4. To build capacity at various levels of healthcare for prevention, early diagnosis, treatment, information communication or behaviour change communication (IEC/BCC) operational research and rehabilitation.
5. To support for diagnosis and cost-effective treatment at primary, secondary and tertiary levels of healthcare.
6. To support for development of database of NCDs through surveillance system and to monitor NCD morbidity and mortality and risk factors.

h. Write note on Gram staining of bacteria.

Ans: Gram staining:

- Gram staining is a common technique used to differentiate two large groups of bacteria based on their different cell wall constituents.
- The Gram stain procedure distinguishes between gram-positive and gram-negative groups by colouring these cells red or violet.

Procedure:

1. Place slide with heat fixed smear on staining tray.
2. Gently flood smear with crystal violet and let stand for 1 minute.
3. Tilt the slide slightly and gently rinse with tap water or distilled water using a wash bottle.
4. Gently flood the smear with Gram's iodine and let stand for 1 minute.
5. Tilt the slide slightly and gently rinse with tap water or distilled water using a wash bottle.
6. The smear will appear as a purple circle on the slide.
7. Decolorize using 95% ethyl alcohol or acetone.
8. Tilt the slide slightly and apply the alcohol drop by drop for 5 to 10 seconds until the alcohol runs almost clear. Be careful not to over-decolorize.
9. Immediately rinse with water.
10. Gently flood with saffranin to counter stain and let stand for 45 seconds.
11. Tilt the slide slightly and gently rinse with tap water or distilled water using a wash bottle.
12. View the smear using a light-microscope under oil-immersion.

Observation:

- **Gram-positive:** Bacteria which retain the crystal violet dye and appear deep violet colour.
- **Gram-negative:** Bacteria which loose violet when washed with alcohol and are stained with red dye saffranin and appear red.

i. Write note on pharmacoeconomics.

Ans: Pharmacoeconomics:

- Field of study that evaluates the behaviours of individuals, firms and markets relevant to use of pharmaceutical products, services and programs, and which frequently focuses on the costs and consequences of that use.
- It is defined as the analysis of the cost of drug therapy to healthcare system and society.
- It is a sub-discipline of health economics.
- A pharmacoeconomics study evaluates the cost (expressed in monetary terms) and effects (expressed in terms of monetary

value, efficacy, or enhanced quality of life) of a pharmaceutical product.

- Pharmacoeconomics studies serve to guide optimal healthcare resource allocation, in a standardized and scientifically grounded manner.
- Pharmacoeconomics refers to the scientific discipline that compares the value of one pharmaceutical drug or drug therapy to another.
- Pharmacoeconomics analysis helps in determining the cost impact of innovative treatments and helps in granting more recognition by healthcare providers, policy makers and public.
- Pharmacoeconomics can be defined as the branch of economics that uses cost-benefit, cost-effectiveness, cost-minimization, cost-of-illness and cost-utility analyses to compare pharmaceutical products and treatment strategies".
- Pharmacoeconomics according to the International Society for Pharmacoeconomics and Outcomes Research (ISPOR): According to the International Society for Pharmacoeconomics and Outcomes Research (ISPOR), pharmacoeconomics is "the study of individuals, firms, and markets with respect to the use of pharmaceutical products, services, and programs, and that focuses on the costs (inputs) and consequences (outcomes) of such use".

Important Role of Pharmacoeconomics:

1. Fixing the price of a new drug and re-fixing the price of an existing drug.
2. Drug development and clinical trials.
3. Finalizing a drug formulary.
4. Introduction of new schemes and programs in hospital pharmacy and clinical pharmacy.
5. Including a drug in the medical/insurance reimbursement schemes.
6. Creating data for promotional materials of medicines.

j. State the causative agent and mode of transmission of:

i. Malaria **ii. Cholera**

Ans: i. Malaria:

Causative agent: Malaria caused by the following parasite: *Plasmodium falciparum*, *Plasmodium vivax*, *Plasmodium ovale*, *Plasmodium malariae*, *Plasmodium knowlesi*.

Mode of transmission

- Usually, people get malaria by being bitten by an infective female Anopheles mosquito. Only Anopheles mosquitoes can transmit malaria and they must have been infected through a previous blood meal taken from an infected person.
- Because the malaria parasite is found in red blood cells of an infected person, malaria can also be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood.
- Malaria may also be transmitted from a mother to her unborn infant before or during delivery ("congenital" malaria).

ii. Cholera:

Causative agent: Cholera is a communicable disease caused by *Vibrio cholerae*

Mode of transmission-

- Spread is mainly by contaminated food, water, milk.
- Human being is the only reservoir of cholera infection.
- Immediate source of infection is the stools and vomitus of cases and carriers.

k. Define: Epidemic, Pandemic and Endemic

Ans:

1. **Epidemic (rapid mass spread):** Epidemic can be defined as sudden increase of a case of disease which is higher than normal in a specific population. It is the quick and rapid spread of the number of cases of a disease above what is normally expected in that population in that area. Epidemics happen when an agent and susceptible hosts are present in adequate numbers, and the agent can be effectively transmitted from a source to the susceptible host.

   For examples: Cholera outbreak, diarrhea outbreak, chickenpox in school going children, etc.

2. **Endemic (particular area):** Endemic means the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area, restricted to the areas throughout the year. Endemic diseases are amongst the major health problems in a particular country or continent as a whole.

   For examples: Ebola, river blindness, etc.

3. **Pandemic (world widespread):** It is an epidemic that affects large geographical regions including different countries or even different continents and usually affecting large number of people in a short time or at the same time.
   For examples: SARS, influenza, Covid-19 which affected millions of people across the globe.

Q3. Attempt all questions of the following. 20 Marks

a. The International Pharmaceutical Federation was founded in year 1912.

b. Write full form of MDG.

Ans: Millennium Development Goals

c. Health is a state of complete Physical, **mental and social well-being and not merely the absence of disease.**

d. The National Health Mission was launched in year 2005 or 2013.

Ans: 2005 or 2013

e. Define the term demography.

Ans: Demography is a scientific study of human populations includes their size, composition, and distribution across space and the process through which population's changes.

f. Breastfeeding awareness week is celebrated in month of _____.

(i) September (ii) August
(iii) January (iv) May

Ans: (ii) August

g. Give two examples of psychotropic substances.

Ans: Alcohol, caffeine, nicotine, heroin, cocaine, amphetamines

h. Write one common cause of air pollution.

Ans: Cause of air pollution.

1. Particles and gases emitted from car, truck, buses exhaust, etc.
2. Insecticides, pesticides, and fertilisers emit harmful chemicals.
3. Factories and industries are the main source of carbon monoxide, organic compounds, hydrocarbons, and chemicals. These are released into the air, degrading its quality.

4. The household cleaning products and paints contain toxic chemicals that are released in the air.

i. Kwashiorkor develops due to deficiency of proteins.

j. The practice of adding vitamins and minerals to food during processing to increase its nutritional value is known as _____

(i) Fortification of food (ii) Food adulteration
(iii) Artificial ripening (iv) Food Security

Ans: (i) Fortification of food

k. Filariasis is caused by-Nematode: *Wuchereria bancrofti*, or *Wucherria malayi* or *Brugia malayi*, or *B. timori*

l. Following are examples of respiratory tract infections, except ____

(i) Smallpox (ii) Amoebiasis
(iii) Mumps (iv) Whooping cough

Ans: (ii) Amoebiasis

m. The causative organism for plague is _____

(i) *Salmonella typhi*
(ii) *Vibrio cholerae*
(iii) *Yersinia pestis*
(iv) *M. tuberculosis*

Ans: (iii) *Yersinia pestis*

n. The full form of MERS is Middle East respiratory syndrome.

o. What do you mean by mortality?

Ans: Mortality is defined as the number of deaths in the population in each period of time.

p. The full form of WHO is World Health Organization.

q. Give one example of any one National Health Programme focused on nutrition.

Ans:

1. Integrated Child Development Service Programme (ICDS)
2. Special Nutrition Programme (SNP)
3. Balwadi Nutrition Programme
4. National Iodine Deficiency Disorders Control Programme
5. Mid-Day Meal Programme
6. National Nutritional Anemia Prophylaxis Programme

r. First National Health Policy was launched by government of India in year ___

(i) 2013 **(ii) 2002**

(iii) 1983 **(iv) 1985**

Ans: (iii) 1983

s. In which year National Health Programme on Mental Health was launched?

Ans: 1982

t. What is the measure of quality of life in different disease states?

Ans:

1. Quality of life index (QLI)
2. Material and physical well-being, relationships with other people, social, community and civic activities, personal development and fulfilment and recreation.

Winter Examination 2023
(Question Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Answer any SIX of the following: **30 Marks**

a. Write in detail about causative agent, mode of transmission, symptoms, prevention, and treatment of typhoid.

b. State in detail about principal solid waste disposal (refuse) methods highlighting its advantages.

c. Enumerate ongoing national health programmes in India. Explain National Iodine Deficiency Disorder Control Programme and National Mental Health Programme.

d. Identify the components given in Fig. 1 and give specific functions of labeled parts.

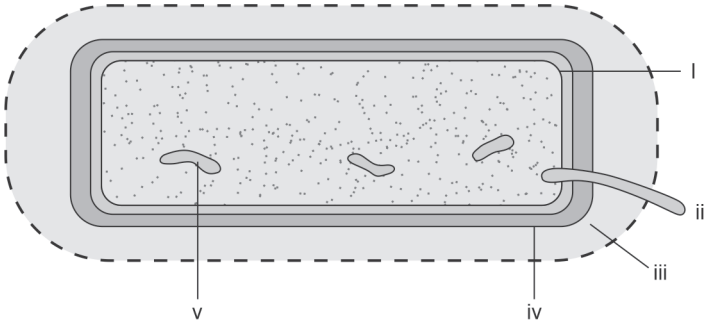


Fig. 1

e. Define the term health. Discuss various dimensions of health.

f. State the meaning of contraceptive methods. Classify them with examples. Describe method of male sterilisation.

g. What is AIDS? Give its causative agent, mode of transmission, symptoms. How pharmacist can help in prevention and control of AIDS.

Q2. Answer any TEN of the following: 30 Marks

a. Write about sources, hazards and prevention of water pollution.
b. Define epidemiology. Give its applications.
d. Describe causative agents, mode of transmission and clinical symptoms of COVID-19.Write about various precautionary measures of COVID-19.
e. Define and classify determinants of health. Explain any one determinant in detail.
f. What do you mean by pharmacoeconomic? Why is there a need for it? Give its applications.
g. Question statement: Identify and name the disease which is caused due to the following micro-organisms.
   i. *P. vivax*
   ii. *Treponema pallidum*
   iii *Brugia malayi*
   iv. Hansen bacillus
   v. Myxovirus
   vi. Varicella-zoster
h. State sources and functions of protein. Explain any one deficiency disease of protein.
i. Explain the objectives and outcomes of Janani Suraksha Yojana (JSY) of Govt of India.
j. State how breast feeding is essential to mother and baby.
k. What do you mean by food poisoning? How can it be identified, prevented and controlled?

Q3. Attempt all questions of the following. 20 Marks

a. Head quarter of NACO in India is located at_____
b. State the meaning of isolation.
c. SDG stands for_____
d. Compare advantages of condom over IUD.
e. Universal Immunization Programme in India was launched in the year_____
f. Vibrio's bacteria have _____ shape.
g. Give full form of FIP
h. Which one of the following is not arthropod borne disease?
   i. Chikungunya
   ii. Dengue
   iii. Filariasis
   iv. None of the above.

i. Define the term drug abuse.
j. State the meaning of health insurance.
k. What happen when tetracycline given with milk?
l. When did GOI Launched National Urban Health Mission as submission under NHM.
m. As per WHO which infectious disease was completely eradicated from India.
n. Increased level of Air pollution can result in _____
   i. Soil erosion
   ii. Global warming
   iii. Respiratory problem
   iv. All of the above
o. What does 'DOTS' stand for?
p. Govt. of India started Non-Diabetic Control Programme in 1987 in 3 states, *except*:
   i. Tamil Nadu
   ii. J and K
   iii. Maharashtra
   iv. Karnataka
q. Which chemical substance is produced by plants which breakdowns starch into sugar and fruits get ripened?
   i. Ethylene
   ii. Calcium carbide
   iii. Chlorophyll
   iv. All of the above
r. Define occupational disease.
s. Which one of the following is not MDG?
   i. Improve maternal health
   ii. Combat HIV
   iii. Develop local partnership in state
   iv. Ensure environmental sustainability
t. In 1995, _____ programme was launched by government of India.

Winter Examination 2023
(Specimen Answer Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Answer any SIX of the following: **30 Marks**

a. Write in detail about causative agent, mode of transmission, symptoms, prevention, and treatment of typhoid.

Ans: Typhoid

Causative agent: It is caused by the bacterium *Salmonella typhi, Salmonella paratyphi*.

Mode of Transmission:

- Transmitted by faecal-oral route or urine-oral route.
- Contaminated food, water, milk.
- Flies also act as mechanical carriers.
- It is also transmitted by contaminated fingers.

Symptoms:

- Severe headache
- Fever
- Stomach pain
- Diarrhoea or constipation
- Cough
- Weakness
- Loss of appetite and weight loss.

Prevention and control:

- Control of the reservoir.
- Early diagnosis by culture of stool and blood.
- Isolation of the patient to prevent the spread of infection.
- Disinfection of stool and urine.
- Water and milk should be consumed only after proper boiling.
- Education of people for sanitary measures like safe drinking water, food and personal hygiene.

- Immunization with TAB vaccine containing *S. typhi*, *S. paratyphi* A and *S. paratyphi* B.

Treatment:

i. Antibiotics—fluoroquinolones, chloramphenicol
ii. Oral rehydration salt (ORS)—management of dehydration

b. State in detail about principal solid waste disposal (refuse) methods highlighting its advantages.

Ans: Solid waste disposal (refuse) methods

1. Dumping
2. Sanitary landfill or controlled tipping
3. Burning or incineration
4. Composting
5. Burial

1. **Dumping:** Dry refuse is mainly dumped in low lying areas which help not only in disposal but also in reclamation of land. By the action of bacteria, the volume of the refuse decreases considerably in volume and is converted gradually into humus. It is not an ideal method. It causes public nuisance; attracts insects and animals it causes air and water pollution.
   Advantages: Inexpensive
2. **Controlled tipping or sanitary landfill:** This is the most satisfactory method of refuse disposal. In this method a trench is dug. The refuse is compactly dumped in these pits and at the end of each working day is covered with earth, when the trench is full; again it is covered with earth and is compacted. In this method the chemical and bacteriological processes decompose the refuse into simple substances with generation of heat. The refuse is fully decomposed at the end of 6 months and can be used as manure.

   Advantages:
   1. Volume can increase with little addition of people/ equipment.
   2. Filled land can be reused for other community purposes.
3. **Incineration or burning:** Refuse can be disposed of hygienically by burning. It requires special equipment called as incinerator. It is a hollow cylinder made of metal; the refuse is put on the land and covered with the incinerator. Hospital

refuse, which is particularly dangerous, e.g. infectious material, is best disposed of by burning.

Advantages:

1. Requires minimum land.
2. Can be operated in any weather.
3. Produces stable odor-free residue.
4. Refuse volume is reduced by half.

4. **Composting:** It is a method of combined disposal of refuse and night soil. The basic principle is, when the refuse and night soil (excreta) are dumped in a pit and covered with earth there is anaerobic decomposition. The heat produced during decomposition kills the organisms and ultimately compost is obtained, which is used as manure. In a big trench, layers of 15 cm refuse alternating with 5 cm layer of excreta are placed on one another till it is full.

Advantages:

1. Reduces landfill waste.
2. Creates rich soil nutrients.
3. Saves water in gardening.
4. Lowers greenhouse gas emissions.
5. Cuts down waste disposal costs.

5. **Burial:** Small trench is dug and refuse is put in it and covered with earth every day and when full, it is covered with earth and another trench is used. It is useful as short term method. **Advantages:** Cheap method

c. Enumerate ongoing National Health Programmes in India. Explain National Iodine

Deficiency Disorder Control Programme and National Mental Health Programme.

Ans: National Health Programmes in India (reproductive, maternal, neonatal, child and adolescent health)

- Janani Shishu Suraksha Karyakaram (JSSK)
- Rashtriya Kishor Swasthya Karyakram(RKSK)
- Rashtriya Bal Swasthya Karyakram (RBSK)
- Universal Immunisation Programme
- Mission Indradhanush (MI)
- Janani Suraksha Yojana (JSY)

- Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)
- Navjaat Shishu Suraksha Karyakram (NSSK)
- National Programme for Family planning
- Laqshya' programme (labour room quality improvement initiative)

National Iodine Deficiency Disorder Control Programme

- Iodine is an essential micronutrient required daily at 100–150 micrograms for normal human growth and development. Deficiency of iodine can cause physical and mental retardation, cretinism, abortions, stillbirth, deaf mutism, squint and various types of goiter.
- Realizing the magnitude of the problem, the Government of India launched a 100 per cent centrally assisted National Goitre Control Programme (NGCP) in 1962. In August 1992 the National Goitre Control Programme (NGCP) was renamed as National Iodine Deficiency Disorders Control Programme (NIDDCP) with a view of wide spectrum of iodine deficiency disorders like mental and physical retardation, deaf mutisim, cretinism, still births, abortions, etc. The programme is being implemented in all the states/UTs for entire population.

Objectives:

- Surveys to assess the magnitude of iodine deficiency disorders in the districts.
- Supply of iodized salt in place of common salt.
- Resurveys to assess iodine deficiency disorders and the impact of iodized salt after every 5 years in the districts.
- Laboratory monitoring of iodized salt and urinary iodine excretion.
- Health education and publicity.

National Mental Health Programme

The National Mental Health Program (NMHP) is a National Health Program in India that was launched in 1982 with the aim of providing mental healthcare services to all citizens. The program is focused on promoting mental health, preventing mental illness, and providing treatment and rehabilitation services for people with mental illness.

The objectives of the NMHP are:

- To ensure the availability and accessibility of minimum mental healthcare for all.
- To encourage the integration of mental health into primary healthcare.
- To promote community participation in the planning, implementation, and monitoring of mental health services.
- To enhance human resources for mental health services.
- To encourage research in the field of mental health.

The functioning of the NMHP involves a range of activities such as:

- Providing mental health services through primary healthcare centres, district hospitals, and medical colleges.
- Conducting community-based interventions and awareness campaigns to promote mental health and prevent mental illness.
- Setting up de-addiction centres to provide rehabilitation services for people with substance abuse problems.
- Training healthcare professionals and community health workers in the management of mental illness.
- Providing financial assistance to states for the development of mental health infrastructure.

d. Identify the components given in Fig. 1 and give specific functions of labeled parts.

Ans:

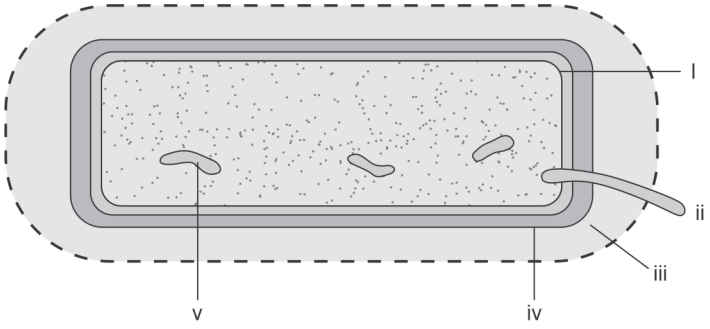


Fig. 1

i. Cytoplasmic membrane
ii. Flagella
iii. Capsule

iv. Cell wall
v. Plasmid

i. **Cytoplasmic membrane:** The most important function of cytoplasmic membrane of bacteria is to form a permeable barrier, regulating the passage of solutes between the cell and the outer environment.
ii. **Flagella:** It helps an organism in movement. They act as sensory organs to detect temperature and pH changes.
iii. **Capsule:** It protects bacteria from toxic compounds and desiccation and allowing them to adhere to surfaces and to escape the immune system of the host.
iv. **Cell wall:** It gives the cell its shape and surrounds the plasma/ cytoplasmic membrane, protecting it from the environment.
v. **Plasmid:** Plasmids are small, circular fragments of DNA that are found in the cytoplasm of bacterial cells. They act as delivery vehicles, or vectors, to introduce foreign DNA into bacteria.

e. Define the term Health. Discuss various dimensions of Health.

Ans: Health: "A state of complete physical, mental and social will being and not merely an absence of disease or infirmity".

Dimensions of Health:

1. Physical health
2. Mental health
3. Social health
4. Spiritual health
5. Emotional health,
6. Socioeconomic health,
7. Environmental health,
8. Educational health
9. Nutritional health.

1. **Physical health:** It is the perfect functioning of the body, i.e. a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of body.

   The signs of physical health are:

   - Good complexion, clear skin, bright eyes
   - Lustrous hair with a body clothed with firm flesh, not too fat.

- Sweet breath, sound sleep
- Smooth, easy, coordinated body movements.
- Good appetite, regular activity of bowel and bladder
- All the organs of the body are of unexceptional size and function normally.

2. **Mental health:** It is defined as a state of balance between the individual and surrounding world, a state of harmony between oneself and others, has self-esteem, self-confidence, self-control and has respect for others.

   Characteristics:

   - They feel good about themselves.
   - They do not become overwhelmed by emotions, such as fear, anger, love, jealousy, guilt, or anxiety.
   - They have lasting and satisfying personal relationships.
   - They feel comfortable with other people.
   - They can laugh at themselves and with others.
   - They should be able to cope up with anxiety and stress, and so they are able to face the problems and solve them intelligently.
   - They can accept life's disappointments.
   - They make their own decisions.

3. **Social health:** It is ability of an individual to adjust with the society. It implies harmony and integration within the individual, between each individual and other member of society and between individuals and the world in which they live.

   Factors affecting social health are: Economic tension, poverty, illiteracy, unemployment, and adverse social relations, etc.

   Characteristics of social health are:

   - Possession of social skills
   - Proper social functioning within the community
   - Ability of oneself to see as a member of the society.

4. **Spiritual health:** It plays a role in health and disease. It refers to that part of the individual which reaches out and strives for meaning and purpose in life.

Spiritual health includes:

- Integrity
- Principles
- Ethics
- Commitment to some higher being.

5. **Other:** Emotional health, socioeconomic health, environmental health, educational health nutritional health.

f. State the meaning of contraceptive methods. Classify them with examples. Describe method of male sterilisation.

Ans: Contraceptive methods: Contraceptive methods are artificial techniques or devices that prevent pregnancy.

Methods of contraception:

Following are the methods of contraception available at present.

A. Temporary methods

a. Barrier methods:
   i. Physical methods: (i) Condom, (ii) Diaphragm, (iii) Vaginal sponge
   ii. Chemical methods: (i) Foams, (ii) Creams, (iii) Suppositories, (iv) Soluble films

b. Intrauterine device (IUDs):
   i. First generation non-medicated IUDs: Loops as Lippes loop
   ii. Second generation medicated IUDs: Metal containing IUDs: Copper-7,
   Copper T-200, T. Cu-380 A or Ag
   iii. Third generation hormone containing IUDs: Progestasert

c. Hormonal methods:
   i. Hormonal pills:
      - Combined pill: Mala-N, Mala-D
      - Progestogen only pill (POP)
      - Postcoital pill: Tab. Unwanted-72, Tab. I-pill 72, Once a month pill, male pill Saheli (Centchroman)
   ii. Slow-release preparations:
   Injectable: DMPA (depot-medroxyprogesterone acetate) and NET-EN] (norethisterone enanthate)
   Subcutaneous implants: Norplant vaginal rings

d. Postconceptional methods
   i. Menstrual regulation
   ii. Menstrual induction
   iii. Abortion (MTP)

B. Permanent methods:

a. Male sterilization (vasectomy)
b. Female sterilization (tubectomy).

C. Miscellaneous methods

a. Behavioural methods
   i. Abstinence
   ii. Coitus interruptus
   iii. Safe period use method
   iv. Vaginal washing method
b. Natural family planning method
   i. Basal body temperature
   ii. Cervical mucus method/Billing's method
   iii. Prolonged lactation method/LAM method (lactational amenorrhea)
   iv. Symptothermal method.

Male sterilization (vasectomy)

- Vasectomy (male sterilization) is a surgical procedure to cut or seal the tubes that carry a man's sperm to permanently prevent pregnancy.
- During the procedure, the tubes that carry a man's sperm, i.e vasa deferentia are cut and tied or sealed to prevent sperm from entering the urethra and thereby prevent fertilization of a female through sexual intercourse.

g. What is AIDS? Give its causative agent, mode of transmission, symptoms.

How pharmacist can help in prevention and control of AIDS.

Ans: AIDS means acquired immunodeficiency syndrome (AIDS) which is a chronic, potentially life-threatening condition is caused by the human immunodeficiency virus (HIV).

Causative organism:

AIDS is a viral infection caused by human immunodeficiency virus (HIV)

Mode of transmission:

- Through sexual contact with the infected person, it is transmitted through vaginal, anal, or oral sex.
- Through contaminated needles and syringes especially those used by drug addicts.
- Maternal transmission through placenta.
- Blood contacts through transfusion of contaminated blood and blood products.

Symptoms

- Recurring fever or profuse night sweats
- Rapid weight loss
- Extreme and unexplained tiredness
- Prolonged swelling of the lymph glands in the armpits, groin, or neck.
- Diarrhoea that lasts for more than a week.
- Sores of the mouth, anus, or genitals
- Pneumonia
- Red, brown, pink, or purplish blotches on or under the skin or inside the mouth, nose, or eyelids
- Memory loss, depression, and other neurologic disorders

Pharmacist can help in prevention and control of AIDS by:

- Increasing awareness: Pharmacists can educate people about HIV risk and prevention and encourage testing for early detection.
- Providing clinical justification: Pharmacists can provide clinical justification for prior authorizations.
- Dispensing HIV prevention medication: Pharmacists can dispense HIV prevention medication without direct patient–physician contact.
- Providing counselling: Pharmacists can provide counselling to help end the HIV epidemic.
- Treatment and prevention of opportunistic infections
- Providing preventative care

Q2. Answer any TEN of the following: 30 Marks

a. Write about sources, hazards and prevention of water pollution.

Ans: Water pollution

The main water pollutants include bacteria, viruses, parasites, fertilizers, pesticides, pharmaceutical products, nitrates, phosphates, plastics, fecal waste and even radioactive substances.

Source of Water Pollution:

- Rapid urbanization and industrialization
- Water from sewage system which contain pathogenic microorganism.
- Waste of industries and agricultural wastes contain pathogenic microorganism and toxic chemicals. (Chemical waste from industries)
- Household wastes are one of the sources which contaminate or pollute the water. Wastes contain substances like vegetables peels, rotten materials and other food wastes.
- Industry is one of the sources of water pollution. They pollute water by draining the waste material into the river or in water sources.
- Chemical fertilizer and pesticides also pollute the water.
- Some human activities like washing clothes, bathing animals in river and other water sources also cause water pollution.
- High amount use of detergent and soap also contaminate the water.

Hazards of Water pollution:

Destruction of biodiversity

Water pollution depletes aquatic ecosystems and triggers excessive growth of phytoplankton (microalgae) in lakes due to eutrophication (excessive presence of nitrates, phosphates, etc.)

Contamination of the food chain

Fishing in polluted waters and the use of wastewater for livestock farming and agriculture can introduce toxins into foods which are harmful to our health when eaten.

Lack of potable water

The UN says that billions of people around the world have no access to clean water to drink or sanitation, particularly in rural areas.

Diseases

The WHO estimates that about 2 billion people have no option but to drink contaminated water. It leads to several diseases such

as cholera, hepatitis A, dysentery, diarrhoea, giardiasis, typhoid and several other GI infections.

Prevention of Water Pollution:

- Protecting water resources
- Legislation, strict implementation, and monitoring for proper disposal of industry waste, agricultural waste, pharmaceutical waste, radioactive waste, plastic, etc.
- Avoiding bathing of animals, humans in water resources
- Avoiding defecation near water resources
- Purification of water on a large scale and household level.

b. Define Epidemiology. Give its applications.

Ans: Epidemiology:

Epidemiology is the study of the distribution and determinants of health-related events and diseases in the population and the application of knowledge to control health problems.

Applications of Epidemiology:

- Epidemiological studies provide information about risk factors, causative agents, a host or carrier, and environmental contributors to the spread of the disease.
- It helps in the identification of diseases which regularly occur in a community.
- It provides logical data for the choice of drug, duration of exposure and dose to stop the spread of disease.
- It helps to devise strategies to treat and prevent diseases in a population.

c. State various ill effects of junk food.

Ans: Ill effects of Junk Food:

- Excess consumption of junk foods leads to inadequate growth and development of the body.
- Junk foods contribute to an increased risk of obesity, diabetes, cardiovascular disease, and many other chronic health conditions.
- Lack of proper nutrition affects immunity.
- High intake of junk foods tends to suppress the function of the brain that helps in learning and memory formation.
- It may lead to loss of appetite and problems in digestion.

- Junk food has a negative impact on energy level and emotional well-being.
- Junk food also has a mental impact which leads to mental depressions.
- Causes fluctuations in blood sugar levels.
- Can cause kidney or liver damage.
- It causes fatigue and weakness.
- It affects the brain function.
- Affects the microflora in the gut.

d. Describe causative agents, mode of transmission and clinical symptoms of COVID-19. Write about various precautionary measures of COVID-19.

Ans: COVID-19

Causative Agent:

Infection with severe acute respiratory syndrome coronavirus 2, also called SARS-CoV-2, causes coronavirus disease 2019 (COVID-19)

Mode of transmission: *COVID-19 spreads in any of the following ways:*

- Person-to-person transmission during close contact with infected person.
- Contact with fomites then touching the mouth, nose, or eyes.
- Transmission through asymptomatic carrier.

Clinical symptoms:

- Cough and headache, Tiredness, and fever.
- Difficulty breathing or shortness of breath loss of speech or mobility, or confusion.
- Loss of taste or smell.
- Rash on the skin or discolouration of fingers or toes.

Precautionary measures:

- Getting vaccinated with COVID-19 vaccination is the most effective way to prevent infection.
- Washing hands regularly with soap and water or clean with alcohol-based hand sanitizer.
- Staying at home and self-isolation when feeling unwell.
- Wearing a properly fitted mask.
- Covering mouth and nose while coughing or sneezing.

e. Define and classify determinants of health. Explain any ONE determinant in detail.

Ans: Determinants of health

The multiple factors working individually or in a group that influence the health of humans to determine one's wellbeing are called determinants of health.

The important factors which determine health are:

1. Individual factors
   a. Heredity
   b. Lifestyle
2. Environment
   a. Internal environment
   b. External environment
3. Socio-economic conditions
   a. Income
   b. Education
   c. Nutrition
   d. Occupation
4. Health related systems

1. Heredity:

- The health of an individual to some extent depends on his genetic constitution.
- The genetic makeup of an individual is unique, and it cannot be changed.
- Several diseases are of genetic origin.
- *For examples:* Diabetes, mental retardation.

2. Lifestyle:

- Means 'the way people live'.
- It reflects the social values, attitudes, and activities of an individual.
- It includes culture, behaviour and habits like smoking and alcoholism.
- Several diseases like heart diseases, cancer and diabetes are related to lifestyle.
- Good life-style like good food, sleep and exercise promotes better health.

f. What do you mean by pharmacoeconomic? Why is there a need for it? Give its applications.

Ans: Pharmacoeconomics

- Pharmacoeconomics is field of study that evaluates the behaviours of individuals, firms and markets relevant to use of pharmaceutical products, services and programs, and which frequently focuses on the costs and consequences of that use.
- It is defined as the analysis of the cost of drug therapy to healthcare system and society.

Need of Study:

- A pharmacoeconomics study evaluates the cost (expressed in monetary terms) and effects (expressed in terms of monetary value, efficacy, or enhanced quality of life) of a pharmaceutical product.
- Pharmacoeconomics studies serve to guide optimal healthcare resource allocation, in a standardized and scientifically grounded manner.
- Pharmacoeconomics refers to the scientific discipline that compares the value of one pharmaceutical drug or drug therapy to another.
- Pharmacoeconomics analysis helps in determining the cost impact of innovative treatments and helps in granting more recognition by healthcare providers, policy makers and public.

Applications:

- Fixing the price of a new drug and re-fixing the price of an existing drug.
- Drug development and clinical trials.
- Finalizing a drug formulary.
- Introduction of new schemes and programs in hospital pharmacy and clinical pharmacy.
- Including a drug in the medical/insurance reimbursement schemes.
- Creating data for promotional materials of medicines.

g. Question statement: Identify and name the disease which is caused due to the following micro-organisms.

Ans:

i. *P. vivax*—malaria
ii. *Treponema pallidum*—syphilis

iii. Brugia malayi—filiariasis
iv. Hansen bacillus—leprosy
v. Myxovirus—common cold, mumps and measles in humans.
vi. Varicella zoster—chickenpox

h. State sources and functions of protein. Explain any one deficiency disease of protein.

Ans: Sources of proteins:

- Animal proteins (first class proteins): Milk, meat, egg, and fish.
- Vegetable sources (second class proteins): Pulses, cereals, beans, and nuts.

Functions of Proteins:

- Repair and maintenance of body tissues.
- Synthesis of bioactive substances and other vital molecules, e.g. enzymes, antibodies, plasma proteins and hemoglobin.
- Body-building.
- Maintenance of osmotic pressure
- Provision of energy: Secondary function becomes important only when there is not enough carbohydrate in the diet and fat stores are depleted.

Deficiency of Proteins

It is a common health problem in India. It is more common in children due to inadequate diet and infections. Protein energy malnutrition manifested by followings forms.

1. Kwashiorkor
2. Marasmus

1. Kwashiorkor: It is severe protein deficiency disease seen in children of group 1 to 4 years.

Symptoms

- Edema
- Depigmentation of hair and hair loss
- GI disturbances as anorexia and diarrhoea
- Hepatomegaly
- Mental changes
- Sometime muscle wasting,
- Apathy

- The patients suffering from kwashiorkor have an emaciated appearance all over the body. They have a type of swelling in the ankles, feet and belly.
- Kwashiorkor is most common in rural areas, especially in the sub-urban regions and areas with low food supply are more prone to this disease.

Treatment: Adequate protein diet along with treating root cause of deficiency disorder

2. Marasmus: It is deficiency of proteins and calories; the disorder common in infants under 1 year.

Symptoms: Severe muscle wasting, severe retardation of growth, thinning of limbs, change in hair texture, diarrhea, fat loss, etc.

Treatment: Adequate diet, treating infections and by promoting health education.

i. Explain the objectives and outcomes of Janani Suraksha Yojana (JSY) of Govt of India.

Ans: Janani Suraksha Yojana

Janani Suraksha Yojana (JSY) is a safe motherhood intervention under the National Health Mission. The scheme, launched on 12th April 2005 by the Hon'ble Prime Minister, is under implementation in all states and union territories (UTs), with a special focus on low performing states (LPS).

Objectives of the JSY:

- Reducing the maternal mortality ratio and infant mortality rate
- Increasing institutional deliveries in BPL families
- Providing cash assistance to eligible pregnant women

Outcomes of the JSY:

The Janani Suraksha Yojana (JSY) is a cash transfer program that provides benefits to pregnant women who have antenatal checkups and deliver in health centers or hospitals.

The program has had several outcomes, including:

1. **Increased institutional delivery:** The program has increased institutional delivery by at-risk mothers, which can reduce maternal mortality and morbidity, improve child survival, and ensure equity in maternal healthcare.

2. **Improved antenatal care:** The program has had large, positive effects on antenatal care, institutional delivery, and skilled birth attendance.
3. **Reduced perinatal and neonatal deaths:** The program has also led to a small, but statistically significant, reduction in perinatal and neonatal deaths.
4. **Improved contraception, breastfeeding, and postnatal** checkups, JSY beneficiaries have consistently higher rates of contraception, early initiation of breastfeeding, and postnatal checkups than non-beneficiaries.
5. **Increased beneficiaries:** The number of beneficiaries has increased from 7.39 lakhs in 2005-06 to 106.48 lakhs in 2013-14.

j. State how breastfeeding is essential to mother and baby.

Ans: Benefit for Child:

- Breast milk provides a baby with ideal nutrition and supports growth and development.
- Breast milk promotes baby's healthy weight.
- Improve resistance power: Mothers milk contains many antibodies, which are responsible for the protection of child against diseases. IgA is the major immunoglobulin in human colostrums and milk.
- Resistance is provided by milk against diseases like asthma, respiratory disease, obesity, diabetes, ear infections, gastro-intestinal infections, cancer, and any syndrome, etc.
- Breastfed babies score higher on IQ tests.

Benefits for Mother

Breastfeeding can protect mothers from many diseases such as:

- Breast and ovarian cancer
- Diabetes
- Heart disease
  - Breastfeeding can help mother to lose weight that you gained during pregnancy.
  - Mothers who breastfeed have a lower risk for depression.
  - Strengthen the bond with their children.

k. What do you mean by food poisoning? How can it be identified, prevented and controlled?

Ans: Food Poisoning:

Food poisoning is an acute gastroenteritis caused by ingestion of food or drink contaminated either by bacteria or their toxins or inorganic substances or poisons derived from plants or animals. Its symptoms include vomiting, diarrhoea, nausea, giddiness, GI upset, etc.

Types of food poisoning:

1. **Non-bacterial food poisoning:** It is caused by chemicals as fertilizers or pesticides or by metals such as cadmium or mercury, etc.
2. **Bacterial food poisoning:** It is caused by ingestion of live bacteria or their toxins, e.g. Salmonella, Staphylococcci, *Cl. botulinum*, *B. cereus*.

Prevention and Control:

i. Food sanitation:
   - It includes inspection of meat and food animals to be free from infection.
   - Food handlers and cooks should maintain personal hygiene.

ii. Refrigeration of food.

iii. Surveillance: Periodic inspection of food samples.

Q3. Attempt all questions of the following. 20 Marks

a. Head quarter of NACO in India is located at New Delhi.

b. State the meaning of isolation.

Ans: Isolation separates sick people with a contagious disease from people who are not sick.

c. SDG stands for Sustainable Development Goals.

d. Compare advantages of condom over IUD.

Ans:

- Safe and easy method.
- No special skills required.
- Condoms do not physically alter the fertility of the person using them.
- Provide protection against STDs.

e. Universal Immunization Programme in India was launched in the year 1985.

f. Vibrio's have curved-rod shape or comma shape.

g. Give full form of FIP.

Ans: International Pharmaceutical Federation (FIP)

h. Which one of the following is not arthropod borne disease.

(i) Chikungunya
(ii) Dengue
(iii) Filariasis
(iv) None of the above.

Ans: (iv) None of above

i. Define the term drug abuse.

Ans: The excessive or addictive use of drugs for non-medical purposes despite social, psychological, and physical problems that may arise from such use.

j. State the meaning of health insurance.

Ans: Health insurance is a type of insurance that covers medical expenses that arise due to an illness.

k. What happen when tetracycline given with milk?

Ans: The administration of tetracycline with milk or dairy products can interfere with the absorption of the medication and reduce its effectiveness.

l. When did GOI launched national urban health mission as sub-mission under NHM.

Ans: 1st May 2013

m. As per WHO which infectious disease was completely eradicated from India.

Ans: Smallpox

n. Increased level of air pollution can result in _____

(i) Soil erosion
(ii) Global warming
(iii) Respiratory problem
(iv) All of the above

Ans: (iv) All of the above

o. What does 'DOTS' stand for?

Ans: Directly observed treatment, short course (DOTS)

p. Government of India Started non-diabetic control programme in 1987 in 3 states, *except*:

(i) Tamil Nadu (ii) J and K
(iii) Maharashtra (iv) Karnataka

Ans: (iii) Maharashtra

q. Which chemical substance is produced by plants which breakdowns starch into sugar and fruits get ripened.

(i) Ethylene (ii) Calcium carbide
(iii) Chlorophyll (iv) All of the above

Ans: (i) Ethylene

r. Define occupational disease.

Ans: Occupational disease defines any disease that is caused due to work or occupation.

OR

An occupational disease is any illness or health condition that is caused by exposure to hazards in the workplace. These hazards can be physical, chemical, biological, or psychosocial.

s. Which one of the following is not MDG.

(i) Improve maternal health
(ii) Combat HIV
(iii) Develop local partnership in state
(iv) Ensure environmental sustainability

Ans: (iii) Develop local partnership in state.

t. In 1995, the Mid-Day Meal **Scheme programme was launched by Government of India.**

Summer Examination 2024
(Question Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Attempt any SIX of the following: **30 Marks**

a. Describe the stages of demographic cycle and state objectives of family planning.
b. Define health. Enlist various determinants of health and explain any three with examples.
c. i. Write causes and ill effects of water pollution.
   ii. What is social impact of drug addiction?
d. Write causative agents, clinical presentation, and role of pharmacists in educating the public in the following communicable disease. (Any two)
   i. Acute diarrhoeal diseases
   ii. AIDS
   iii. Dengue
e. Enlist all ongoing National Health Programme in India and explain any one focused on vector borne diseases.
f. Define the following
   i. Microbiology
   ii. Morbidity
   iii. Quarantine
   iii. Endemic
   v. Pandemic
g. Define epidemiology. Explain different types of epidemiological methods.

Q2. Attempt any TEN of the following: **30 Marks**

a. Write causes and prevention of food poisoning.
b. State advantages and disadvantages of bottle feeding in infants.
c. What is pharmacoeconomics? Write its importance.
d. Enlist various respiratory infections and write causative agent for any one respiratory infection.

e. Write about
   i. Artificial ripening
   ii. Balanced diet
f. Write the causative agent, mode of transmission and types of leprosy.
g. Write note on sources, functions of proteins.
h. Define social pharmacy. Give any two examples of FIP development goals.
i. Write causative agent and mode of transmission of
   i. Tetanus
   ii. COVID-19
   iii. Filariasis
j. Discuss role of pharmacist in national health programmes.
k. Name various methods of solid waste disposal. Explain any one.

Q.3 Attempt all of the following: 20 Marks

a. Name the program launched by the Government of India to address the issue of prevalence of orodental disease.
b. Match the followings:

Type of bacteria	*Shapes*
1. Cocci	a. Rod
2. Bacilli	b. Comma
3. Vibrios	c. Spiral
4. Spirilla	d. Spherical

   i. 1—d, 2—a, 3—b, 4—c
   ii. 1—d, 2—c, 3—b, 4—a
   iii. 1—c, 2—b, 3—a, 4—d
   iv. 1—a, 2—b, 3—c, 4—d
c. HMO stands for _____
d. Name the disease characterized by the deficiency of iron.
e. Name the protozoan that causes amoebiasis.
f. Is the immunity induced by vaccines which are the preparations of live or killed microorganisms or their products.
   i. Artificial active immunity
   ii. Natural active immunity
   iii. Natural passive immunity
   iv. Artificial passive immunity
g. Name one National Health Programme focused on nutrition.
h. Define noise:

i. BCG stands for _____
j. What is sewage?
k. Write full form of NHP.
l. Which one of the following diseases is transmitted easily through droplet infection?
   i. Plague ii. Tetanus
   iii. Syphilis iv. Chickenpox
m. Vitamin A is also known as:
n. Give example of health programme for maternal health.
o. Name any two-dimensions of health.
p. Write a full form of SDG.
q. Which of the following is not an example of a mechanical contraceptive?
   i. Condoms ii. Diaphragms
   iii. IUCD iv. Rhythm method
r. WHO stands for _____
s. Name any one National Health Program for mental health.
t. Tuberculosis is spread by _____
   i. Droplets spread while coughing
   ii. Shaking someone's hand
   iii. Touching bed linens or toilet seats
   iv. Sharing toothbrushes

Summer Examination 2024
(Specimen Answer Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Attempt any SIX of the following: **30 Marks**

a. Describe the stages of demographic cycle and state objectives of family planning.

Ans: Demographic cycle:

The history of the world's population since 1950, suggests a demographic cycle of five stages through which a nation passes:

i. **First stage (high stationary):** This stage is characterized by a high birth rate and high death rate which cancel each other and the population remains stationary, e.g. India till 1920

ii. **Second stage (early expanding):** The death rate begins to decline but the birth rate remains unchanged, e.g. many South Asian and African country

iii. **Third stage (late expanding):** The death rate declines still further and the birth rate tends to fall resulting in the continuous growth of the population as birth rate supersedes the death rates, e.g. India has entered this phase and China and Singapore are already in this phase.

iv. **Fourth stage (low stationary):** This stage is characterized by a low birth rate and low death rate resulting stationary population with the result the population becomes stationary or zero growth rate, e.g. Austria during 1980-1985, UK, Denmark, Sweden 1980-1985 GR: 0.1

v. **Fifth stage (declining):** The population becomes to decline because the birth rate is lower than the death rate, e.g. Germany and Hungary

Objectives:

i. To avoid unwanted births,
ii. To bring about wanted births,

iii. To regulate the intervals between pregnancies,
iv. To control the time at which birth occurs in the relation to the age of the parent,
v. To determine the number of children in the family.

b. Define health. Enlist various determinants of health and explain any three with examples.

Ans: Health: "A state of complete physical, mental and social well-being and not merely an absence of disease or infirmity".

Determinants of health

The multiple factors working individually or in a group that influence the health of humans to determine one's wellbeing are called determinants of health.

The important factors which determine health are:

1. Individual factors
   a. Heredity
   b. Lifestyle
2. Environment
   a. Internal environment
   b. External environment
3. Socio-economic conditions
   a. Income
   b. Education
   c. Nutrition
   d. Occupation
4. Health related systems

1. Heredity

- The health of an individual to some extent depends on his genetic constitution.
- The genetic makeup of an individual is unique, and it cannot be changed
- Several diseases are of genetic origin.
- *For examples:* Diabetes, mental retardation.

2. Lifestyle

- Means 'the way people live'.
- It reflects the social values, attitudes, and activities of an individual.

- It includes culture, behaviour and habits like smoking and alcoholism.
- Several diseases like heart diseases, cancer and diabetes are related to lifestyle.
- Good life-style like good food, sleep and exercise promotes better health.

3. Environment

- Diseases are caused by changes in environment like air, water, climate, etc.
- Environment is of two types: Internal and external
- Internal environment relates to each tissue, organ and system of the body and their harmonious functioning.
- External environment is the physical, biological, and other surrounding components to which an individual is exposed.
- Environment has a direct influence on the physical, mental, and social wellbeing of an individual. This includes housing, family structure, water supply, stress, etc.

4. Socio-economic conditions

- Includes income, education, nutrition, and occupation.
- Income: Rich peoples have capacity to seek better medical care. So, they are healthy. But rich people are inactive and sedentary, so they are prone for heart diseases, obesity, diabetes etc.
- Education: Education especially female education has an influence on health. Education helps people to understand the importance of clean environment and maintaining good health.
- Nutrition: Starvation has an adverse effect on health. Good nutrition is essential for normal growth and for resistance against infection.
- Occupation: Employment provides income. Employed people enjoy good health. Due to lack of income unemployed people do not have access to healthcare.

5. Health services

- Aim of health and family welfare services is to treat diseases, prevent illness and promotion of health.
- The purpose of health services is to improve the health status of population. Health services like:
  - Safe water supply,
  - Proper sanitation,

– Immunization,
– General screening programme for infectious diseases,
– Family planning

6. Other health related systems

It includes agriculture, education, industry, and rural development They have an impact on health by raising the standards of living.

ci. Write causes and ill effects of water pollution.

Ans: Sources/causes of water pollution

- Domestic wastes may contaminate the water.
- Sewage containing human excreta, urine and dung are discharged into water forms a major source of water pollution.
- Industrial wastes which contain toxic chemicals may pollute water.
- Agricultural wastes like fertilizers, pesticides cause water pollution.
- Thermal waste from thermal and nuclear power plants may discharge large amount of high temperature water into river which may affect aquatic life.
- Radioactive dust formed during atomic explosion contains radioisotopes which get into water and pollute the water.
- Many oil carrying ships moving in the large oceans may meet with an accidents leading to spilling of millions of tons of oil in the sea, causes water pollution.

Ill effects of water pollution on human health

- Polluted water may cause epidemic disease like cholera, dysentery, typhoid, jaundice, etc.
  Mercury is one of the most toxic metals produces abdominal and chest pains, diarrhea, mercury poisoning.
- Lead metal causes symptoms like constipation, loss of appetite.
- Arsenic presents in the polluted water may cause mental disturbance, liver cirrhosis, lung cancer, kidney damage, etc.
- The insecticides which get accumulated in the body of fish, enters in human body through food chain may cause cancer.
- Deficient O, in water due to industrial wastes, kills fishes and other aquatic animals

ii. What is social impact of drug addiction?

Ans: (i) **Isolation:** Isolation is the most common social effect drug abuse.

The drug abuser eventually maintains a connection only with his drug of choice.

ii. **Financial:** Depending upon the drug of choice, the financial strain can be devastating. Buying drugs becomes more important to the drug addict than daily responsibilities.

iii. **Relationship:** Close connections to the drug abuser are affected. Relationships become dysfunctional, as the co-dependent recognizes the effects of the drug.

iv. **Family:** Social effects on the family can be felt long after the addiction. The family can be dissolved, children can develop emotional issues and trust can be shattered.

d. Write causative agents, clinical presentation, and role of pharmacists in educating the public in the following communicable disease. (any two)

i. Acute diarrhoeal diseases

ii. AIDS

iii. Dengue

Ans: i. Acute diarrhoeal diseases:

Acute diarrhoea is defined as the abrupt onset of abnormally frequent discharge of semisolid or fluid faecal matter from the bowel, 3 or more loose stools per day lasting less than 14 days, chronic or persistent diarrhoea is defined as an episode that lasts longer than 14 days.

Causative agents: Acute diarrhoea can be caused by several different agents. Common infective causative agents include bacteria such as *Salmonella* and *Vibrio parahaemolyticus*, and viruses such as norovirus, rotavirus, sapovirus and astrovirus. Less common causative agents include the bacteria causing bacillary dysentery, cholera and Shiga toxin-producing *Escherichia coli* infection, etc. Acute diarrhoeal diseases may occur in all ages, with children being more commonly affected.

Symptoms: Patients with acute diarrhoeal diseases present with sudden onset of frequent loose or watery stools, often accompanied by vomiting and fever. The disease is usually mild with spontaneous recovery.

Dehydration and shock may occur in severe cases.

Mode of Transmission

Acute diarrhoeal diseases are usually transmitted by contaminated hands or ingestion of contaminated food or drinks, and occasionally by an aerosol spread with contaminated droplets of splashed vomitus. Outbreaks may occur in settings like institutions and child care centres.

Incubation Period:

The incubation period is usually from a few hours to 5 days after exposure for bacterial diarrhoea and 1 to 3 days for viral diarrhoea.

Prevention and Control:

It can be prevented by the following measures:

1. **Maintain good personal hygiene:** Perform hand hygiene frequently, especially before handling food or eating, and after using the toilet. Wash hands with liquid soap and water and rub for at least 20 seconds. Then rinse with water and dry with a disposable paper towel or hand dryer. If hand washing facilities are not available, or when hands are not visibly soiled, hand hygiene with 70 to 80% alcohol-based hand rub is an effective alternative.

   Wear gloves and a surgical mask while disposing of or handling vomitus and faeces and wash hands thoroughly afterwards.

   Refrain from work or attending school, and seek medical advice if suffering from vomiting or diarrhoea.
2. **Maintain good food hygiene:** Adopt the 5 keys to food safety in handling food, i.e. choose (choose safe raw materials); clean (keep hands and utensils clean); separate (separate raw and cooked food); cook (cook thoroughly); and safe temperature (keep food at a safe temperature) to prevent food-borne diseases, drink only boiled water from the mains or bottled drinks from reliable sources.

   Avoid drinks with ice of unknown origin.

   Purchase fresh food from hygienic and reliable sources. Do not patronise illegal hawkers.

   Wash and peel fruit by yourself and avoid eating raw vegetables.

   Cook all foods thoroughly before consumption, particularly seafood and shellfish.

3. **Maintain good environmental hygiene:** Regularly clean and disinfect frequently touched surfaces such as furniture, toys and commonly shared items.

   Use absorbent disposable towels to wipe away obvious contaminants such as vomitus or faecal spillage.

   Maintain good indoor ventilation.

   Maintain proper sanitary facilities and drainage system.

   Clean and disinfect toilets used by infected persons and soiled areas.

Treatment:

Acute diarrhoeal diseases are usually managed by fluid and electrolyte replacement. Oral sugar and electrolyte solution. The patient should consult his/her family doctor for proper management if the diarrhoea is severe. Self-medication is not advisable.

Severe, non-febrile and non-bloody diarrhoea: Loperamide antibiotics

Role of Pharmacist in Prevention of Acute Diarrhoeal Disease:

Pharmacists can educate patients on strategies to prevent diarrhea. Individuals should wash their hands with soap and water for at least 20 seconds, and a hand sanitiser that contains at least 60% alcohol should be used when soap and water are not available.

Tell parents to ensure that their children are vaccinated to protect against rotavirus, which can cause severe watery diarrhea.

Pharmacists are highly accessible to the general public; they will likely encounter many questions regarding acute diarrhea

ii. AIDs

Causative organism

AIDS is a viral infection caused by human immunodeficiency virus (HIV)

Mode of transmission

1. Through sexual contact with the infected person it is transmitted through vaginal, anal or oral sex.
2. Through contaminated needles and syringes especially those used by drug addicts.
3. Maternal transmission through placenta.

4. Blood contacts through transfusion of contaminated blood and blood products.

Prevention and control

1. Screening of blood donors for HIV.
2. Use of disposable syringes for injection.
3. Screening of high risk groups like prostitutes and drug addicts.
4. Avoid going to prostitutes for sexual intercourse.
5. Do not indulge in oral or anal sex.
6. Avoiding promiscuous sexual contact.
7. Have only one uninfected sexual partner and do not indulge with multiple sex partners.
8. Use of contraceptives like Nirodh.
9. Instruments used for piercing the nose, tattooing, etc. carry a high risk of transmitting the disease properly sterilized.
10. Treatment with antiviral agents like azidothymidine. It can prolong the life of a patient.
11. Health education about AIDS, its problems and methods of prevention.

Role of Pharmacist in the prevention of AIDS:

a. Pharmacists can arrange a short-term training intervention for providing information.
b. Pharmacists have a crucial role in the effective management of STIs, particularly in the management of urethral discharge. They may need to limit their management of genital ulcers to referring customers to laboratories and medical practitioners.
c. History taking: Questions on main symptoms and previous treatment.
d. Urethral discharge: Treat (ciprofloxacin + doxycycline), refer only if a patient comes— back not improved.
e. Vaginal discharge: Treat for vaginitis (antifungal cream + metronidazole), if not improved refer for management of cervicitis.
f. Preventive activities including information to clients and the public on STI/HIV, prevention and treatment promotion of condoms, are opportunities currently under-exploited by pharmacists for limiting the spread of STI and HIV.

iii. Dengue:

Causative agent: The dengue viruses (DENV-1, 2, 3 and 4) are the causative agents of dengue fever that are enveloped single positive stranded RNA viruses belonging to the Flaviviridae family.

Clinical Presentation:

i. Mild dengue fever:
   1. High fever.
   2. Body rash.
   3. Vomiting and feeling nauseous.
   4. Muscle, bone, or joint pain.
   5. Pain behind the eyes.
   6. Headache.

ii. Severe dengue haemorrhagic fever (DHF)/dengue shock syndrome (DSS)

1. Small blood spots under the skin.
2. Intense stomach pain.
3. Persistent vomiting.
4. Internal bleeding, leading to blood vomit, faeces or urine.
5. Weak pulse.
6. Bleeding from the mouth, gums, or nose.

Role of pharmacist in prevention of dengue:

a. Educate the patients to keep the area clean and water storage tanks, never leave the tanks uncovered.
b. Make aware to avoid contact between man and mosquito virus.
c. Counsel about drinking water storage containers needs to be drained at the interval of 3–4 days.
d. Guide to use of mosquito nets, repellant creams, mosquito coils, mats and aerosols.
e. Pharmacists should suggest applying Larvicides to kill immature aquatic stages. Ultra-low volume fumigation against adult mosquitoes.

e. Enlist all ongoing National Health Programme in India and explain any one focused on vector borne diseases.

Ans: Ongoing National Health Programme in India

1. National Tobacco Control Programme (NTCP)
2. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS)
3. National Programme for Control Treatment of Occupational Diseases
4. National Programme for Prevention and Control of Deafness (NPPCD)

5. National Mental Health Programme
6. National Programme for Control of Blindness and Visual Impairment
7. Pradhan Mantri National Dialysis Programme
8. National Programme for the Healthcare for the Elderly (NPHCE)
9. National Programme for Prevention and Management of Burn Injuries (NPPMBI)
10. National Oral Health Programme
11. National Programme for Palliative Care (NPPC)
12. National Programme for Prevention and Control of Flurosis (NPPCF)
13. National Iodine Deficiency Disorders Control Programme

National Vector Borne Disease Control Programme (NVBDCP)

Launched in 2003-04 by merging National Anti-Malaria Control programme, National Filariasis Control Programme and kala azar control programmes. Japanese B encephalitis and dengue/DHF have also been included in this Program Directorate of NAMP is the nodal agency for prevention and control of major vector borne diseases.

List of Vector Borne Diseases Control Programme legislations

i. National Anti-Malaria Programme
ii. Kala-Azar Control Programme
iii. National Filaria Control Programme
iv. Japanese Encephalitis Control Programme
v. Dengue and Dengue Hemorrhagic fever
vi. Chikungunya

Objectives for vector-borne diseases

i. To prevent mortality due to vector-borne diseases namely malaria, Yala star, dengue/DHF and Japanese encephalitis
ii. To reduce morbidity due to malaria, dengue/DHF, chikunguniya and Japanese encephalitis.
iii. Elimination of kala-azar and lymphatic filariasis.

Objectives

i. Training of healthcare professionals on appropriate animal bite management, and rabies postexposure prophylaxis.

ii. Advocacy for states to adopt and implement interdermal routes of postexposure prophylaxis for animal bite victims and post-exposure prophylaxis for high-risk categories.
iii. Strengthen human rabies surveillance system. Strengthening of regional laboratories under NRCP for rabies diagnosis.
iv. Creating awareness in the community through advocacy, communication and social mobilization.

Functioning and Outcome

i. Training and capacity building.
ii. Guidelines and technical support to states. Rabies and animal bite surveillance.
iii. Laboratory strengthening for rabies diagnosis.
iv. IEC activities.
v. Inter-sectoral coordination for rabies control.
vi. Operational research.

f. Define the following:

i. Microbiology: It is the study of microorganisms with respect to their cytology, physiology, reproduction and useful activities or harms caused.
ii. Morbidity: Morbidity has been defined as "any departure, subjective or objective, from a state of physiological well-being". The problem is equivalent to such terms as sickness, illness, disability, etc.
iii. Quarantine: Quarantine has been defined as "the limitation of freedom of movement of such good persons or domestic animals exposed to the communicable disease for some time no longer than the incubation period of the disease. Quarantine is necessary to protect people from infected persons.
iv. Endemic: When an infectious disease is more or less prevalent in a locality or a community, it is called endemic.
v. Pandemic: A pandemic is a disease outbreak that spreads across countries or continents. It affects more people and takes more lives than an epidemic.

g. Define epidemiology. Explain different types of epidemiological methods

Ans: Epidemiology

Epidemiology is defined as the study of the distribution and determinants of health-related events and diseases in the

population and also the application of this knowledge to control health problems.

Different types of epidemiological methods

Epidemiology is concerned with the study of disease occurrence in people. Epidemiologist employees carefully designed research strategies to know disease aetiology. The three major epidemiologic methods or studies are:

a. Descriptive studies
b. Analytical studies
c. Experimental or intervention studies.

a. Descriptive studies: Descriptive studies are usually the first phase of an epidemiologic investigation. These studies are concerned with observing the distribution of disease or health-related problems in human populations and identifying the cause of disease.

The descriptive studies investigate:

When is the disease occurring? Time distribution
ii. Where is it occurring? Place distribution
iii. Who is getting the disease? Person distribution.

b. Analytical studies

Analytical studies are the second major type of epidemiological study. In analytical studies, individuals from populations are studied to get a clue about the exact cause of the disease.

Analytical studies involve two distinct types of observational studies:

i. Case-control study: Case-control study is comparison study.

ii. Cohort study: The cohort study is usually undertaken to obtain additional evidence to support the existence of an association between suspected cause and disease.

c. Experimental epidemiology studies

Experimental epidemiology studies are carried out with the aims:

i. To provide scientific proof of aetiological or (risk) factors that may permit modification of control of those diseases, and
ii. To provide a method of measuring the effectiveness and efficiency of health services for the prevention, control and

treatment of disease and improve the health of the community. Experimental studies may be conducted on animals or human beings (clinical trials).

Q2. Attempt any TEN of the following: 30 Marks

a. Write causes and prevention of food poisoning.

Ans: Bacterial food poisoning is of following types:

i. **Salmonella food poisoning:** It is caused by Salmonella group of microorganisms which includes *S. typhi* and *S. enteritidis* foods like milk, milk products, eggs, meat, fish and stored food get contaminated with these bacteria.

ii. **Staphylococcus food poisonings:** *Staphylococcus aureus* causes poisoning in food which spreads from ice-creams, milk, milk products, cakes, etc.

iii. **Botulism:** It is a fatal form of food poisoning which is caused by the ingestion of food contaminated with neurotoxins produced by *Clostridium botulinum* which in under-processed, preserved foods, preserved pickles, fruits, vegetables, etc.

Prevention and Control:

i. Food should be freshly prepared and eaten at the same time.
ii. Foods must be protected against flies, rats, mice, and dust.
iii. Surplus food should be kept in a refrigerator or cool place.
iv. Personal hygiene and food sanitation should be ensured by the individual particularly engaged in the handling, preparation and cooking of the food.
v. It should be checked that food animals and meat should be free from any kind of disease.
vi. Restaurants, hotels and messes or places where food is cooked should be supervised strictly for the quality and hygienic cooking methods.

b. State advantages and disadvantages of bottle feeding in infants.

Ans: Bottle feeding in infants:

Advantages

1. Anyone can feed the baby.
2. It can be done in public.
3. Keeping a track of your baby's intake is easy.

4. You do not have to worry if your breast milk supply is low.
5. You do not have to worry about making changes to your diet
6. Bottle feeding helps babies who have lactose intolerance.
7. The mother's health condition does not affect the baby.

Disadvantages

1. Formula milk is not as nutritious as breast milk.
2. Preparing the milk for bottle feeding takes time and effort.
3. Bottle feeding equipment is an added expense.
4. Bottle-feeding may compromise your baby's immune system.
5. It affects the mother-baby bonding.
6. Bottle feeding can be inconvenient.
7. Breastfeeding keeps the mother healthy.

c. What is pharmacoeconomics? Write its importance.

Ans: Pharmacoeconomics: Pharmacoeconomics is defined as "the branch of economics that uses cost-benefit, cost-effectiveness, cost-minimization, cost-of-illness and cost-utility analyses to compare pharmaceutical products and treatment strategies".

Explanation:

- Pharmacoeconomics is a sub-discipline of health economics.
- A pharmacoeconomic study evaluates the cost and effects of a pharmaceutical product.
- Pharmacoeconomics refers to the scientific discipline that compares the value of pharmaceutical drug to drug therapy another.

Objective/Importance of Pharmacoeconomic Study

1. It helps to decide which drug is to develop.
2. To estimate and understand the full impact of new therapy.
3. To make an informed decision regarding appropriate use of drugs which have been developed.
4. To make the best use of limited resources.
5. To determine which healthcare alternative provide the best healthcare outcome in term of money spent.
6. To improve allocation of resources for pharmaceutical products and services.

d. Enlist various respiratory infections and write causative agent for any one respiratory infection.

Ans: Respiratory infections, e.g. chickenpox, measles, rubella, mumps, influenza (including, Avian-flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebola.

Name of Infection	*Causative agent*
Chickenpox	Varicella zoster
Measles	RNA paroxysmal virus
Rubella	Rubella virus
Mumps	Paramyxovirus
Avian-flu,	Influenza A virus
H1N1,	Influenza virus A,B,C
SARS,	SAR-CoV COVID-19
MERS,	MERS-CoV-19
COVID-19	SAR-CoV COVID-19
Diphtheria	Corynebacterium diptheria
Whooping cough	Bordetella pertusis
Meningococcal meningits	*Haemophilus meningitis* or *Neisseria meningitis*
Tuberculosis	*Mycobacterium tuberculosis*
Ebola.	Ebola virus

e. Write about

i. Artificial ripening ii. Balanced diet

Ans: i. Artificial ripening: Artificial ripening is the process by which ripening is controlled to achieve desired characteristics intended for better consumer acceptance and improving sales. It is generally carried out on climacteric fruits so there is uniform ripening.

Mostly used artificial ripeners are:

i. Calcium carbide
ii. Acetylene gas
iii. Ethephon
iv. Ethylene
v. Ethylene glycol

ii. Balanced diet:

Balanced diet is a diet, which comprises adequate amounts of necessary nutrients required for the healthy growth and

development of our body. It contains a sufficient amount of fibre and other nutrients which provide the appropriate amount of energy and adequate amounts of water.

A diet that contains all the vital nutrients required by the human body is called a balanced diet.

For a balanced diet one must:

i. Aim to eat at least five portions of fruits and vegetables each day.
ii. Drink plenty of water (six to eight glasses are recommended, though this will vary).
iii. Try to include at least two portions of fish every week.
iv. Get into the habit of eating breakfast daily, it can help reduce snacking later on.
v. Adults are advised to conduct 150 minutes of moderate exercise every week.

f. Write the causative agent, mode of transmission and types of leprosy.

Ans: Leprosy

Leprosy is a chronic, curable infectious disease mainly causing skin lesions and nerve damage.

Causative Agent: Leprosy, a chronic disabling disease, is caused by *Mycobacterium leprae*. The disease mainly affects peripheral nerves. Also, affects the skin muscles, the eye, bones, testes and internal organs. India accounts for one-third of the leprosy cases in the world.

Symptoms:

Leprosy causes severe disfiguring, skin sores and nerve damage in arms, legs and skin areas. Light coloured or red skin patches with reduced sensation.

Mode of Transmission:

Leprosy is transmitted by the following ways:

i. Direct contact (body contact) between an infectious patient and a healthy but susceptible person.
ii. By indirect contact with fomites such contaminated clothes.
iii. Transmission may occur by droplet infection.
iv. Leprosy may also be transmitted via breast milk from lepromatous mothers, by insect vectors. However, these routes are not considered important ones.

Prevention and Control:

Leprosy can be controlled by the following ways:

i. Early detection of all cases in the community. This may be done by contact survey, group survey or mass surveys.
ii. Health education: The patient, family and the community should be educated on the need for regular treatment, protection of children, family) planning.

Treatment:

i. Chemotherapy: Initially diapason is considered a choice of drug, but now multidrug therapy is recommended using drugs dapsone, rifampicin and clofazimine.
ii. Dapsone is also used for chemoprophylaxis.
iii. BCG vaccination, its value in leprosy control is unclear.
iv. Rehabilitation therapy is initiated for restoration of all treated cases physically, mentally and socially. This is an important aspect of leprosy control.

Role of Pharmacist in Prevention of Leprosy

Pharmacists can assess the appropriateness, efficacy, and safety of anti-leprotic therapy by monitoring patients and ensuring medication adherence.

By increasing awareness of leprosy among laypeople and patients about health facilities linked to national leprosy programmes providing quality-assured diagnosis and treatment of leprosy.

They can educate patients and clinicians about the expected therapy outcomes and the side effects as well as drug interactions associated with drugs

g. Write note on sources, functions of proteins

Ans: Proteins: Proteins are of greatest importance in human nutrition. Proteins are composed of carbon, hydrogen, nitrogen, oxygen and sulphur in varying proportions. Sometimes they contain phosphorus, iron and occasionally other elements.

Daily Requirements of Proteins:

The recommended daily allowance of protein for adults is one gram per kilogram of body weight. But, infants, children, women during pregnancy and lactation needs more proteins. Standard

daily allowances are recommended by Indian Council of Medical Research (ICMR).

Extra proteins are needed in conditions involving either loss or degeneration of body tissues, e.g. blood loss, surgery, proteinuria burns, diabetes, etc.

Functions of Proteins

Proteins are made of amino acids. Their functions are as follows:

i. Bodybuilding.
ii. Repair and maintenance of body tissues.
iii. Maintenance of osmotic pressure.
iv. Synthesis of substances like antibodies, plasma proteins, haemoglobin, enzymes, hormones, and coagulation factors.
v. Production of heat and energy like carbohydrates.

Sources

We can obtain protein in foods such as nuts, lentils, beef, rice, chicken, beef, etc.

Examples: Meat, dairy products, legumes, nuts, seafood and eggs.

h. Define social pharmacy. Give any two examples of FIP development goals.

Ans: Social Pharmacy: Social pharmacy is defined as a discipline concerned with the behavioural sciences relevant to the utilization of medicine by both consumers and healthcare professionals.

FIP Development Goals:

FIP Development Goals are in the area of:

i. Academic capacity,
ii. Early career training strategy,
iii. Quality assurance,
iv. Advanced and specialist development,
v. Competency development,
vi. Leadership development,
vii. Advancing integrated services,
viii. Working with others
ix. Continuing professional development strategies,
x. Equity and equality,
xi. Impact and outcomes,
xii. Pharmacy intelligence,
xiii. Policy development,

xiv. Medicines expertise,
xv. People-centered care,
xvi. Communicable diseases,
xvii. Antimicrobial stewardship,
xviii. Access to medicines, devices and services,
xix. Patient safety,
xx. Digital health,
xxi. Sustainability in pharmacy.

i. Write causative agent and mode of transmission of:

i. Tetanus ii. COVID-19
iii. Filariasis

Ans:

i. Tetanus:

Causative agent: *Clostridium titani*

Mode of transmission: Tetanus is acquired through infection of a cut or wound with the spores of the bacterium *Clostridium tetani*, and most cases occur within 14 days of infection. Tetanus cannot be transmitted from person to person.

ii. COVID-19:

Causative agent: Coronovirus 2, also called SARS-COV-2

Mode of transmission-COVID-19 is mainly transmitted when people breathe in air contaminated by droplets and small airborne particle containing the virus. Infected people exhale those particles as they breathe, talk, cough, sneeze, or sing.

iii. Filariasis:

Causative agent: Lymphatic filariasis is a mosquito-borne disease caused by the filarial parasites, *Wuchereria bancrofti* and *B. malayi.*

Mode of Transmission:

Filariasis is transmitted by the bite of mosquitoes harbouring infective larvae.

Two types of mosquitoes transmit the infection:

a. Culex fatigans: Bancroftian filariasis.
b. Mansonoidse mosquitoes: Malayan filariasis

j. Discuss role of pharmacist in national health programmes.

Ans: Pharmacist in National Health Programmes.

- Pharmacists are well trained and knowledgeable to advance the mission of public health.
- The knowledge, skills and expertise of a pharmacist enable them to support the public healthcare by promoting healthy life-styles, preventing long-term illness and by guiding patients to better manage their medicines.
- A community pharmacist strengthens the public health system in a broad perspective.
- Pharmacists have a great significant role to play in all national health programmes.
- A pharmacist can improve healthcare of all Indian citizens.
- A pharmacist can be indulged in the prevention and control of disease in a many ways.
- Pharmacists play a vital role in screening of various diseases, e.g. diabetes, hypertension, liver fibrosis.
- Pharmacists provide information and skills to individuals so they can prevent specific diseases.
- Pharmacist may involve in immunization programmes and provide an advice on healthy lifestyles.
- Pharmacist helps in counseling and advising the public on the treatment of minor ailments.
- The pharmacist can play an important role in top five national public health programmes.

k. Name various methods of solid waste disposal. Explain any one solid waste/disposal:

Ans: Methods of solid waste disposal

The principal methods of refuse disposal are:

i. **Dumping:** Refuse is dumped in low lying areas. This is mainly an easy method of disposal of dry refuse. But, this method is considered as a most in-sanitary method that creates public hazards and pollution of the environment

ii. **Controlled tipping:** This is the most suitable method of refuse disposal where suitable land is available. The material is placed in a trench, or another suitable area, adequately compacted and covered with earth or mud at the end of the working day. Chemical, bacteriological and physical changes occur in buried refuse.

iii. **Incineration or burning:** Incineration of refuse is considered as the most suitable method when no suitable land is available and when refuse contains incinerable matter. Refuse is disposed of by burning, Incineration is a waste treatment process that involves the combustion of organic or medicinal substances contained in waste materials.

iv. **Composting:** Composting is a method of combined disposal of refuse and sludge. It is a natural process, whereby an organic matter breaks down under bacterial action resulting in the formation of relatively stable humus-like material, called the "Compost" which has considerable manurial value for the soil.

v. **Manure pits:** In rural areas, where there is no system for collection and disposal of refuse, digging manure pits by individual house-holder can solve the refuse disposal problem. The refuse is collected and dumped in manure pits and covered in each working day. After 5–6 months, refuse is converted into manure. Thus, it is a simple and most effective method of refuse disposal.

Q.3 Attempt ALL questions of the following: 20 Marks

a. Name the program launched by the Government of India to address the issue of prevalence of orodental disease.

Ans: National Oral Health Programme (NOHP)

b. Match the followings:

Type of bacteria	Shapes
1. Cocci	a. Rod
2. Bacilli	b. Comma
3. Vibrios	c. Spiral
4. Spirilla	d. Spherical

Options:

A. 1—d, 2—a, 3—b, 4—c
B. 1—d, 2—c, 3—b, 4—a
C. 1—c, 2—b, 3—a, 4—d
D. 1—a, 2—b, 3—c, 4—d

Ans: A. 1—d, 2—a, 3—b, 4—c

c. HMO stands for Health Maintenance Organization.

d. Name the disease characterized by the deficiency of iron.

Ans: Iron deficiency anemia

e. Name the protozoan that causes amebiasis.

Ans: *Entamoeba histolytica*

f. _____ is the resistance induced by vaccines which are the preparations of live or killed microorganisms or their products.

(i) Artificial active immunity
(ii) Natural active immunity
(iii) Natural passive immunity
(iv) Artificial passive immunity

Ans: (i) Artificial active immunity

g. Name one National Health Programme focused on nutrition.

Ans:

1. Integrated Child Development Services Scheme (ICDS)
2. Mid-Day Meal Programs (MDM)
3. Special Nutrition Programs (SNP)
4. Applied Nutrition Programs (ANP)
5. Balwadi Nutrition Programs (BNP)
6. National Nutritional Anaemia Prophylaxis Program (NNAPP)
7. National Program for Prevention of Blindness due to Vitamin A Deficiency
8. National Goitre Control Program (NGCP).

h. Define noise.

Ans: Noise is unwanted or harmful sound considered unpleasant, loud, or disruptive to hearing.

i. BCG stands for Bacillus Calmette-Guerin.

j. What is sewage?

Ans: Sewage is waste water from residences and from commercial, institutional and public facilities containing solid and liquid excreta.

k. Write full form of NHP.

Ans: National health policy (NHP)

l. Which one of the following diseases is transmitted easily through droplet infection?

(i) Plague **(ii) Tetanus**
(iii) Syphilis **(iv) Chickenpox**

Ans: (iv) Chickenpox

m. Vitamin A is also known as Retinol.

n. Give example of health programme for maternal health.

Ans:

1. Janani Suraksha Yojana (JSY)
2. Janani Shishu Suraksha Karyakaram (JSSK)
3. Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)
4. Surakshit Matritva Aashwasan (SUMAN)
5. Pradhan Mantri Matru Vandana Yojana
6. DAKSHATA

o. Name any two dimensions of health.

Ans:

1. Physical dimension
2. Mental dimension
3. Emotional dimension
4. Spiritual dimension
5. Social dimension
6. Occupational dimension
7. Environmental dimension

p. Write full form of SDG.

Ans: Sustainable Development Goals (SDGs)

q. Which of the following is not an example of a mechanical contraceptive?

(i) Condoms **(ii) Diaphragms**
(iii) IUCD **(iv) Rhythm method**

Ans: (iv) Rhythm method

r. WHO stand for World Health Organization (WHO).

s. Name any one National Health Programme for mental health.

Ans: National Mental Health Programme (NMHP)

t. Tuberculosis is spread by _____

(i) Droplets spread while coughing
(ii) Shaking someone's hand
(iii) Touching bed linens or toilet seats.
(iv) Sharing toothbrushes

Ans: (i) Droplets spread while coughing.

Winter Examination 2024
(Question Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Attempt any SIX of the following: **30 Marks**

a. Define health. Explain dimensions of health
b. What is scope of family planning? Classify methods of contraception.
c. Define vaccine and immunization. Describe various types of vaccines.
d. What is microbiology? Differentiate between bacteria and virus. Give examples of protozoa.
e. Write causative agent, mode of transmission symptoms and types of tuberculosis.
f. Write causative agent, mode of transmission and prevention of any two:
   (i) AIDS
   (ii) Dengue
   (iii) Leprosy
g. List any four ongoing National Health Program for NCDs and explain one.

Q2. Attempt any TEN of the following: **30 Marks**

a. Enlist the priority areas in NHP 2017. When was first National Health Policy launched?
b. Explain sources and effects of water pollution
c. What is demography? Explain demographic cycle.
d. Describe junk food. What are ill effects of consuming junk food?
e. Give suitable example of following:
   (i) Fortification of food, (ii) Adulteration of food, (iii) Genetically modified food
f. Define communicable diseases. Discuss modes of transmission of communicable diseases.

g. Define:
   (i) Quarantine
   (ii) Pandemic
h. Draw structure of bacteria with diagram.
i. Write causative agent, mode of transmission, clinical presentation of typhoid.
j. Describe Pradhan Mantri Jan Arogya Yojna.
k. Define pharmacoeconomics. Explain importance or benefits of pharmacoeconomics

Q3. Attempt all questions. 20 Marks

a. Define social pharmacy.
b. Write full form of SDG.
c. Number of development goals given by FIP is ____
d. Mention any 2 indicators of health.
e. Breastfeeding has exclusive health benefits for _____
   (i) Baby
   (ii) Lactating mother
   (iii) Both baby and mother
   (iv) None
f. Depletion of ozone layer happens due to air pollution. State true or false.
g. Mention any 2 methods of solid waste disposal.
h. What is meant by occupational illness?
i. Match the following correctly:

(i) Calcium	(a) Cretinism
(ii) Iron	(b) Pellagra
(iii) Iodine	(c) Anaemia
(iv) Vitamin B_3	(d) Osteomalacia

j. Define nutrition.
k. Varicella zoster virus is causative agent of _____
   (i) Chickenpox (ii) Diphtheria
   (iii) AIDS (iv) Dengue
l. Write causative agent of filariasis.
m. Write full form of SARS.
n. Acid fast staining (Ziehl-Neelsen) is used for identification of_____
   (i) Corynebacterium (ii) Mycobacterium
   (iii) Plasmodium (iv) Streptobacilli
o. Write vector involved in transmission of chikungunya.

p. National Nutritional Anaemia Prophylaxis Programme aims to promote _____
   (i) Regular intake of iron and folic acid foods.
   (ii) Blood transfusion
   (iii) Emergency treatment of anaemia
   (iv) None of above.

q. Mother Child Health Program, give one example.

r. NPCDCS is a program covering _____.
   (i) Cancer
   (ii) Diabetes
   (iii) Cardiovascular disease
   (iv) All of these

s. WHO removed India from the list of countries with active endemic wild poliovirus transmission in the year _____.

t. QALY stands for _____.

Winter Examination 2024
(Specimen Answer Paper)
First Year Diploma in Pharmacy
Subject—Social Pharmacy (20115)

Time: 3 Hours **Max Marks: 80**

Q1. Attempt any SIX of the following: **30 Marks**

[*Refer to Specimen Answer Papers of Summer 2022, Winter 2022, Summer 2023, Winter 2023, Summer 2024 Examination and Answers from this book for the Question 1 (a), (b), (c), (d), (e), (f), (g)]

Q2. Attempt any TEN of the following: **30 Marks**

[*Refer to Specimen Answer papers of Summer 2022, Winter 2022, Summer 2023, Winter 2023, Summer 2024 Examination and Answers from this book for the Question 2 (a), (b), (c), (d), (e), (f), (g), (h), (i), (j), (k)]

Q3. Attempt ALL questions. **20 Marks**

a. Define social pharmacy.

Ans: The social pharmacy can be defined as the branch of science that scientific studies treatment, monitoring tools, patient behaviour and its impact on patient health

b. Write full form of SDG.

Ans: Sustainable development goals.

c. No of development goals given by FIP are ____

Ans: 21 goals are given by FIP.

d. Mention any 2 indicators of health.

Ans:

1. Mortality indicator
2. Morbidity indicator
3. Disability indicator
4. Nutritional status indicator
5. Healthcare delivery indicator
6. Social and mental health indicator

7. Environmental indicator
8. Health policy indicator

e. Breastfeeding has exclusive health benefits for:

(i) Baby (ii) Lactating mother
(iii) Both baby and mother (iv) None

Ans: (iii) Both baby and mother

f. Depletion of ozone layer happens due to air pollution. State true or false.

Ans: True

g. Mention any 2 methods of solid waste disposal.

Ans: 1. Dumping
2. Sanitary land filling
3. Burning
4. Composting
5. Burial

h. What is meant by occupational illness?

Ans: An occupational illness is a health condition or disorder caused by exposure to a risk factor in the workplace, such as physical, chemical, biological, or organizational factors.

i. Match the following correctly:

Ans:

i. Calcium	(d) Osteomalacia
ii. Iron	(c) Anaemia
iii. Iodine	(a) Cretinism
iv. Vitamin B_3	(b) Pellagra

j. Define nutrition.

Ans: Nutrition is the process by which an organism uses food and other nourishing substances to support its life. OR
Nutrition is the process of providing or obtaining the food necessary for health and growth.

k. Varicella zoster virus is causative agent of:

Ans: (i) Chickenpox

l. Write causative agent of filariasis.

Ans: *Wuchereria bancrofti* or *Brugia malayi* or *B. timori*

m. Write full form of SARS.

Ans: Severe acute respiratory syndrome (SARS)

n. Acid fast staining (Ziehl-Neelsen) is used for identification of _____

Ans: (ii) Mycobacterium

o. Write vector involved in transmission of chikungunya.

Ans: *Aedes aegypti* or *Aedes albopictus.*

p. National Nutritional Anaemia Prophylaxis Programme aims to promote.

Ans: (i) Regular intake of iron and folic acid foods

q. Mother Child Health Program, give one example.

Ans:

1. Janani Suraksha Yojana (JSY)
2. Janani Shishu Suraksha Karyakram (JSSK)
3. Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)
4. Pradhan Mantri Matru Vandana Yojana (PMMVY)

r. NPCDCS is a program covering _____

(i) Cancer
(ii) Diabetes
(iii) Cardiovascular disease
(iv) All of these

Ans: (iv) All of these

s. WHO removed India from the list of countries with active endemic wild poliovirus transmission in the year _____?

Ans: 2012

t. QALY stands for_____

Ans: Quality-adjusted life-year (QALY)

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