

**SAMPLE CONTENT**

**PERFECT**

# BIOLOGY

**Vol.  
II**



**Based on Latest Paper Pattern and Textbook**

**Commensalism:**

Cattle egrets exist in a commensal relationship with foraging buffaloes. The egrets feed on insects that are dislodged during the movement of grazing livestock without either benefiting or harming the buffaloes.



**Std. XII Sci.**

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# PERFECT BIOLOGY (Vol. II)

Std. XII Sci.

## Salient Features

- Written as per **Latest Board Paper Pattern**
- Subtopic-wise segregation for powerful concept building
- Complete coverage of Textual Exercise Questions and Intext Questions
- Marks provided to the Questions as per relevant weightage wherever deemed necessary
- Relevant Previous Years' Board Questions:  
**March 2009 to July 2023**
- Each chapter contains:
  - 'Quick Review' of the chapter for quick revision
  - 'Apply Your Knowledge' section for application of concepts
  - 'Exercise' to provide Theory questions and MCQs for practice
  - 'Competitive Corner' to give the glimpse of prominent competitive examinations
  - 'Topic Test' at the end of each chapter for self-assessment
- Includes Important Features for holistic learning:
  - *About the Chapter*                      - *Reading Between the Lines*                      - *NCERT Corner*
  - *Enrich Your Knowledge*                      - *Gyan Guru*                      - *Connections*
  - *Caution*
- Q.R. codes provide:
  - The Video/PDF links boosting conceptual retention
  - Solutions of Topic Tests
  - Model Question Paper along with Solution
- Includes Board Question Paper of March 2024 (Solution in PDF format through Q.R. code)

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## PREFACE

**Perfect Biology Vol. II, Std. XII Sci.** is intended for every Maharashtra State Board aspirant of Std. XII, Science. The scope, sequence, and level of the book are consistent with the latest textbook released by the Maharashtra State board.

At this crucial juncture in their lives, when the students are grappling with the pressures of cracking a career-defining board examination, we wanted to create a book that not only develops the necessary knowledge, tools, and skills required to excel in the examination, but also enables students to appreciate the beauty of the subject and piques their curiosity.

We believe that students respond favourably to meaningful content, if it is presented in a way that is easy to read and understand, rather than being mired down with facts and information. Consequently, we have always placed the highest priority on writing clear and lucid explanations of fundamental concepts. Moreover, special care has been taken to ensure that the topics are presented in a logical order. The coherent Question/Answer approach helps students expand their horizon of understanding of the concepts.

The primary purpose of this book is to assist the students in preparing for the board examination. However, this is closely linked to other goals: to exemplify how important and how incredibly interesting Biology is, and to help the student become an expert thinker and problem solver.

The chapter opener, entitled '*About the Chapter*' is engaging, short introduction designed to capture students imaginations and stimulate their appetites for the topic that the chapter addresses. The scope of the book extends beyond the State Board examination as it also offers a plethora of Multiple Choice Questions (MCQs) in order to familiarize the students with the pattern of competitive examinations.

In addition, the Topic-Test has been carefully crafted to focus on concepts, thus providing the students with a quick opportunity for self-assessment and giving them an increased appreciation of chapter-preparedness. '*Model Question Paper*' along with solution based on updated Board Paper Pattern is provided which can be accessed through Q.R. Code to help students assess their preparedness for final Board Examination.

We believe that the study of Biology helps in the understanding of many fascinating and important phenomena. In this vein, we have put an effort to relate Biology to real-world events in order to show students that Biology is a vibrant, constantly evolving science that has relevance in our modern world. We hope this book becomes a valuable tool for you and helps you to understand the concepts of Biology.

Our **Perfect Biology Vol. II, Std. XII Sci.** adheres to our vision and achieves several goals: **building concepts, recapitulation, self-study, self-assessment** and **student engagement**-all while encouraging students towards cognitive thinking.

The flow chart on the adjacent page will walk you through the key features of the book and elucidate how they have been carefully designed to maximize the student learning.

*We hope the book benefits the learner as we have envisioned.*

Publisher

**Edition:** Sixth

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we've nearly missed something or want to applaud us for our triumphs, we'd love to hear from you.

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## KEY FEATURES

*'About the Chapter'* is a short introduction designed to stimulate students' appetite for the topic.

About the chapter

Reading between the lines

Reading between the lines provides elaboration or missing fragments of the concept which is essential for complete understanding of the concept.

NCERT Corner covers information from NCERT textbook relevant to topic.

NCERT Corner

Connection

Connections enable students to interlink concepts covered in different chapters.

Caution helps students to clarify the differences between two related words or concepts.

Caution

Diagrams in Hand-drawn Format

Diagrams in Hand-drawn format are easy to memorize, save time and efforts of the students.

Q.R. code provides:

- i. Access to a video/PDF in order to boost understanding of a concept or activity
- ii. Solutions to the Topic Tests
- iii. Model Question Paper with solution
- v. Solution to Board Question Paper of March 2024

Q.R. Codes

Enrich Your Knowledge

Enrich Your Knowledge presents fascinating information about the concept covered.

Continued...

## KEY FEATURES

Gyan Guru illustrates real life applications or examples related to the concept discussed.

**GG-Gyan  
Guru**

**Apply  
Your  
Knowledge**

Apply Your Knowledge includes challenging questions.

Quick review includes tables/ flow charts to summarize the key points in a chapter.

**Quick  
Review**

**Competitive  
Corner**

Competitive Corner presents latest questions from prominent [NEET (UG), MHT-CET] competitive exams based entirely on the syllabus covered in the chapter.

Includes relevant Board questions from March 2009 to July 2023

**Board  
Questions**

Sample Content

## PAPER PATTERN

- There will be one single theory paper of 70 Marks and practical examination of 30 Marks in Biology.
- Duration of theory paper will be 3 hours.

**Section A:** (18 Marks)

This section will contain Multiple Choice Questions and Very Short Answer (VSA) type of questions.

There will be 10 MCQs and 8 VSA type of questions, each carrying **One** mark.

Students will have to attempt all the questions.

**Section B:** (16 Marks)

This section will contain 12 Short Answer (SA-I) type of questions, each carrying **Two** marks.

Students will have to attempt any 8 questions.

**Section C:** (24 Marks)

This section will contain 12 Short Answer (SA-II) type of questions, each carrying **Three** marks.

Students will have to attempt any 8 questions.

**Section D:** (12 Marks)

This section will contain 5 Long Answer (LA) type of questions, each carrying **Four** marks.

Students will have to attempt any 3 questions.

### Distribution of Marks According to the Type of Questions

| Type of Questions |              |          |
|-------------------|--------------|----------|
| MCQ               | 1 Mark each  | 10 Marks |
| VSA               | 1 Mark each  | 8 Marks  |
| SA - I            | 2 Marks each | 16 Marks |
| SA - II           | 3 Marks each | 24 Marks |
| LA                | 4 Marks each | 12 Marks |

### Disclaimer


This reference book is transformative work based on latest Textbook of Std. XII Biology published by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. We the publishers are making this reference book which constitutes as fair use of textual contents which are transformed by adding and elaborating, with a view to simplify the same to enable the students to understand, memorize and reproduce the same in examinations.

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Chapters 1 to 8 are a part of **Std. XII: Perfect Biology (Vol. I)**

[Reference: Maharashtra State Board of Secondary and Higher Secondary Education, Pune - 04]

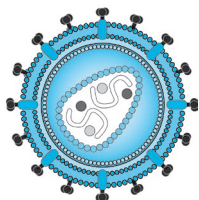
- Note:**
1. \* mark represents Textual question.
  2. # mark represents Intext question.
  3.  symbol represents textual questions that need external reference for an answer.

Scan the adjacent Q.R. Code to know more about our **“Model Question Papers with solutions”** book for Std. XII (Sci.) and Gear up yourself to score more in the XII Board Examination.



Scan the adjacent Q.R. Code to know more about our **“Board Questions with Solutions”** book for Std. XII (Sci.) and Learn about the types of questions that are asked in the XII Board Examination.



**About the chapter...**

The intent of this chapter is to inculcate the value of a good health and hygienic practices among the students, along with explaining the harmful effects of addictions and drugs. It also introduces common human diseases with their causative agents, symptoms preventive measures, treatments and also the various components of our immune system which are in action to cope with these diseases.

This chapter carries a weightage of 4 marks with options and 3 marks without options in the board examination.

**CONTENTS AND CONCEPTS**

10.0 Introduction  
10.1 Immunity  
10.2 Structure of Antibody  
10.3 Common Human Diseases

10.4 Adolescence  
10.5 Addiction  
10.6 Drug Abuse

**10.0 Introduction**

**Q.1. Can you recall?** (*Textbook page no. 221*)

i. **Generally individuals are conscious about their health. So define health.** [1 Mark]

**Ans:** Health is defined as the state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.

ii. **Define infectious and non infectious disease? Give their examples.** [2 Marks]

**Ans:**

a. **Infectious disease:** The diseases which are transmitted from infected person to another healthy person either directly or indirectly, are known as infectious or communicable diseases. e.g. Malaria

b. **Non-infectious diseases:** The diseases that cannot be transmitted from infected person to another healthy person, either directly or indirectly are known as Non-Communicable or Non-Infectious diseases. e.g. Cancer and deficiency diseases

**\*Q.2. Define health.** [1 Mark]

**Ans:** Refer Q.1 (i)

**Q.3. Which factors are essential to maintain good health?** [1 Mark]

**Ans:** To maintain good health, it is necessary that to have hygienic balanced diet, clean drinking water, personal and community hygiene, regular physical exercise, knowledge about diseases and their effect on body, proper disposal of waste and control of vectors.

**Q.4. Define resistance to infectious agents:**

[1 Mark]

**Ans:** Resistance is the ability to prevent the damage or disease, through our defense mechanism.

**10.1 Immunity**

**Q.5. Answer the following:** [1 Mark Each]

i. **What is the body's defense mechanism that protects against various infectious agents?**

ii. **What is the branch of science that focuses on the study of the immune system, its responses to foreign substances, and its role in resisting infection by pathogens?**

**Ans:**

i. Immune

ii. Immunology

**Q.6. What are antibodies and antigens?** [2 Marks]

**Ans:**

i. Any foreign substance invading the body and capable of stimulating an immune response, is called an **antigen**.

ii. The protective chemicals produced by immune cells in response to antigens are called **antibodies**.

**\*Q.7 Describe the different types of immunity.**

[4 Marks]

**Ans:** There are two types of immunity i.e. Innate or Inborn (inherited) immunity and Acquired or Adaptive immunity.

i. **Innate immunity or Inborn immunity:** Innate immunity is the resistance to infections that an individual possesses genetically.





It is the natural (inborn) defense system of the body. It is not affected by prior contact with microorganisms or immunization.

It is non-specific, when it indicates a degree of resistance to infection in general.

Innate immunity comprises of the various types of barriers which prevent entry of foreign agents into the body.

**a. Epithelial surface:**

1. The intact skin and mucous membranes (secrete mucous) covering the body, protects against invasion by microorganism(s).
2. The healthy skin possesses bactericidal activity due to the presence of high concentrations of salt in drying **sweat**.
3. **Sebaceous secretions** and long chain of fatty acids have bactericidal and fungicidal properties.
4. The **mucosa** of the respiratory tract has several innate mechanisms of defense.
5. The nose prevents entry of microorganisms to a large extent, the inhaled particles being arrested through **hair** at or near the nasal orifices.
6. Those foreign particles that pass the nasal orifices are held by **mucus lining** the epithelium and are swept back to pharynx where they tend to be swallowed or coughed out.
7. The **cough reflex** is an important defence mechanism of respiratory tract.
8. The mouth is constantly bathed in **saliva** which has inhibitory effect on microorganisms.
9. The acidity of **gastric secretions** in the stomach destroys micro-organisms.
10. The flushing action of **urine** eliminates bacteria from the urethra.
11. **Spermine** and **zinc** present in semen are antibacterial.

**b. Antimicrobial substances in blood and tissues:**

1. The **complement system** contains more than 30 serum proteins, circulating in the blood in an inactive state.
2. The presence of microbial pathogens activates the '**Complement cascade**' to eliminate pathogens.
3. The **interferons** are a class of cytokines (soluble proteins) released by cells infected with viruses and certain white blood cells to stimulate other cells to protect themselves from viral infection.

**c. Cellular factors in innate immunity:**

1. Natural defence against the invasion of blood and tissues by microorganisms and other foreign particles, is mediated to a large extent by **phagocytic cells** which ingest and destroy them.
2. Phagocytic cells are grouped as microphages and macrophages.

3. These cells remove foreign particles that enter the body.
4. A class of lymphocytes called **Natural killer (NK) cells** is important in non-specific defence against viral infections and tumors.

**d. Fever:**

1. Increase in the body temperature following the infection is a natural defense mechanism.
2. It helps to accelerate the physiological processes to destroy the invading pathogens.
3. Fever stimulates the production of interferons and helps in recovery from viral infections.

**e. Acute phase proteins (APPs):**

1. Infection or injury leads to a sudden increase in concentration of certain plasma proteins, collectively called **acute phase proteins**.
2. These include C Reactive Protein (CRP), Mannose binding protein, Alpha-1-acid glycoprotein, Serum Amyloid P, etc.
3. APPs are believed to enhance host resistance, prevent tissue injury and promote repair of inflammatory lesions.

**ii. Acquired immunity:** The resistance that an individual acquires during life is known as Acquired immunity or Adaptive or Specific immunity.

It involves the formation of antibodies in the body, which neutralize the antigens.

Acquired immunity is of two types:

**a. Active immunity:** It is the resistance developed by individuals as a result of an **antigenic stimulus** (exposure to antigen).

It also known as "Adaptive immunity". Active immunity may be natural or artificial.

**1. Natural Acquired Active immunity:** Immunity acquired due to **infection** is called natural active immunity.

It is developed after entry of pathogens in the body.

It is long-lasting immunity. **e.g.** Person who has recovered from attack of measles develops natural acquired active immunity to measles, for the life time.

**2. Artificial Acquired Active immunity:** It is the resistance induced by **vaccines**.

Vaccine is introduced into the body to stimulate the formation of antibodies by the immune system.

**e.g.** Polio vaccine, BCG vaccine etc. such immunity may be temporary or permanent.

**b. Passive immunity:** Passive immunity is acquired when **ready-made antibodies** are received by the body cells. i.e. Body cells do not take any active part in the production of immunity.

Passive immunity can be acquired either naturally or artificially.



- 1. Natural Acquired Passive immunity:**  
Before birth **maternal antibodies** are transferred from mother to foetus through placenta.

After birth, antibodies are transferred from mother to infant through colostrum (first milk of mother) and continue throughout the period of breast feeding.

The antibodies received by baby from mother remain in the body for a short time.

Therefore, natural acquired passive immunity is short lived.

- 2. Artificially Acquired Passive immunity:**  
This immunity is developed by injecting **previously prepared antibodies** using serum from humans or animals. **e.g.** Antibodies obtained from hyper immunised horses are injected to humans against rabies pathogens. It is short lived.

#### READING BETWEEN THE LINES



*The complement system comprises of group of normally inactive proteins in blood plasma and on plasma membranes.*

*When activated, these proteins “complement” or enhance certain immune reactions.*

*The complement system causes cytolysis (bursting) of microbes, promotes phagocytosis, and contributes to inflammation.*



#### Connections

In chapter 8, you have studied about phagocytic cells – neutrophils and macrophages in detail.

#### NCERT Corner

##### Transplantation

- In case of organ failure in human beings, organ transplantation is the only option.
- Grafts cannot be taken from any source since they would be rejected sooner or later.
- Before undertaking graft/ transplant, tissue matching and blood group matching are essential.
- Cell-mediated immune response is responsible for graft rejection.

- Q.8. What are the unique features of acquired immunity?** [2 Marks]

**Ans:** Acquired or Adaptive immunity has the following unique features.

- Specificity:** It can produce specific antibody or T-lymphocyte against a particular antigen/pathogen.
- Diversity:** It can recognize a vast variety of diverse pathogens or foreign molecules.
- Discrimination between self and non-self:** It differentiates between own body cells (self) and foreign (non self) molecules.
- Memory:** When the immune system encounters a specific foreign agent for the first time, it generates an immune response and eliminates the invader. This is called first encounter. The immune system retains the memory of the first encounter. As a result, a second encounter with same pathogen brings about quicker and stronger immune response.

#### NCERT Corner

##### Allergies and Auto Immunity

- An allergy is the hypersensitivity of immune system of a person to some foreign substance called allergen.
- Allergens act as antigens and stimulate the formation of antibodies which bind to mast cells. Mites in dust, pollens, animal dander etc. are some common examples of allergens.
- The antibodies produced are IgE type.
- Allergens combine with antibody-bound mast cells which rupture and release histamine and serotonin. Histamine causes hypersensation.
- Drugs like anti-histamine, adrenaline and steroids reduce the symptoms of allergy.
- Autoimmunity: Type of immune disorder when the immune system of an individual starts destroying its own body cells. This leads to variety of diseases called autoimmune diseases.  
e.g. Rheumatoid arthritis.

Page no. **59** to 87 are purposely left blank.

To see complete chapter buy **Target Notes** or **Target E-Notes**



**ii. Modes of infection:**

- a. According to current evidence, COVID-19 virus is primarily transmitted between people through respiratory droplets and contact routes.
- b. Droplet transmission occurs when a person is in close contact (within 1 m) with someone who has respiratory symptoms (e.g., coughing or sneezing) and is therefore at risk of having his/her mucosae (mouth and nose) or conjunctiva (eyes) exposed to potentially infective respiratory droplets.
- c. Transmission may also occur through fomites in the immediate environment around the infected person.
- d. Therefore, transmission of the COVID-19 virus can occur by direct contact with infected people and indirect contact with surfaces in the immediate environment or with objects used on the infected person.
- e. In the context of COVID-19, airborne transmission may be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed; i.e., endotracheal intubation, etc.

**[Source:**

<https://www.who.int/news-room/commentaries/detail/modes-of-transmission-of-virus-causing-covid-19-implications-for-ipc-precaution-recommendations>]

**iii. Preventive measures:**

- a. Clean your hands often. Use soap and water, or an alcohol-based hand rub.
- b. Maintain a safe distance from anyone who is coughing or sneezing.
- c. Don't touch your eyes, nose or mouth.
- d. Cover your nose and mouth with your bent elbow or a tissue when you cough or sneeze.
- e. Stay home if you feel unwell.
- f. If you have a fever, a cough, and difficulty breathing, seek medical attention. Call in advance.
- g. Follow the directions of your local health authority.

**[Source:**

<https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>]

**iv. Treatment:**

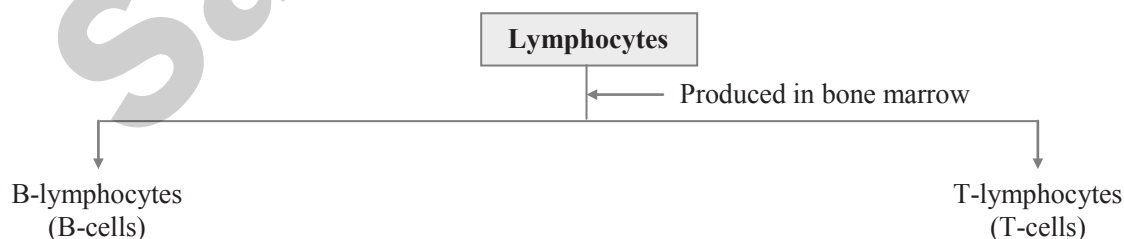
- a. To date, there are no specific vaccines or medicines for COVID-19.
- b. If you feel sick you should rest, drink plenty of fluid, and eat nutritious food.
- c. Stay in a separate room from other family members, and use a dedicated bathroom if possible.
- d. Clean and disinfect frequently touched surfaces.

**APPLY YOUR KNOWLEDGE**

**Q.141. What are the two types of lymphocytes? How do they differ from each other?**

**[3 Marks]**

**Ans:**



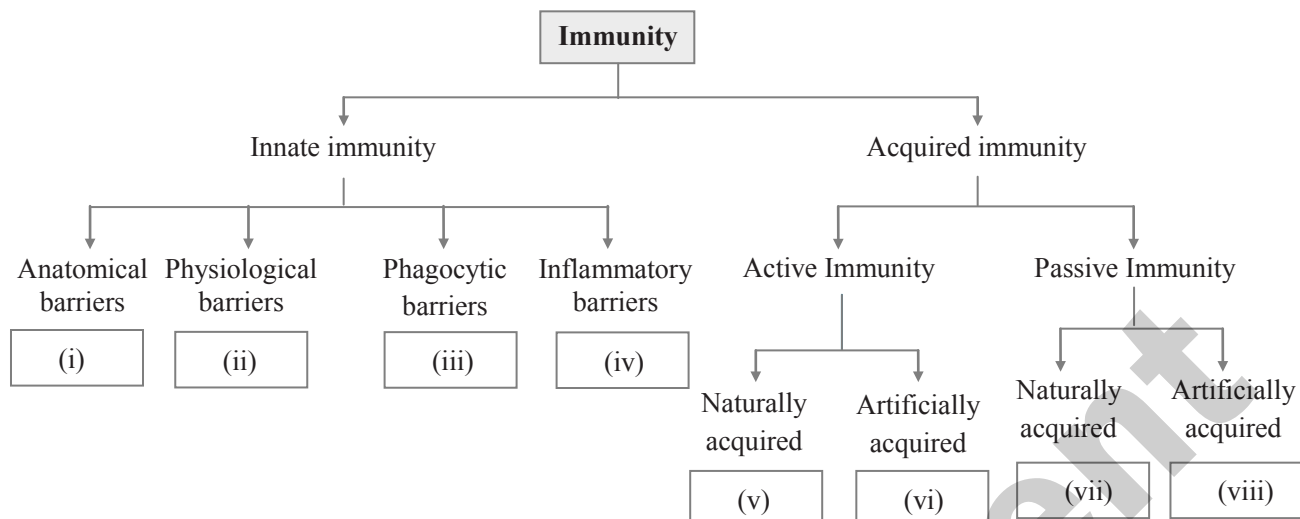
- Mature in bone marrow.
- Generate antibody-mediated immunity.
- Do not respond to organ transplantation.

- Mature in thymus.
- Generate cell-mediated immunity.
- Stimulate B-lymphocyte production.
- Respond to organ transplantation.



Q.142. Fill in the boxes with correct examples.

[4 Marks]



Ans:

- i. Skin/Mucous membrane
- ii. Body temperature / pH
- iii. Phagocytes – Macrophages / Neutrophils
- iv. Release of histamines and prostaglandins
- v. Lifetime protection from an infection after recovery
- vi. Polio vaccine / BCG vaccine
- vii. Maternal antibodies
- viii. Hyper-immunized horse antibodies injected in humans against rabies pathogens

Q.143. Identify the correct disease and route of transmission by the given symptoms.

[1 Mark Each]

- i. Fever and sweating lasting for 4-6 hours (periodic intervals).
- ii. Appearance of 'rose spots' on the front of the chest.
- iii. Rash on the skin that expands to appear like a ring and becomes itchy.
- iv. Blood and mucus in stool. Liver abscesses.

Ans:

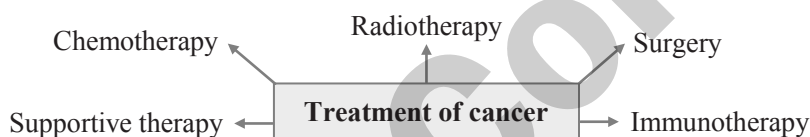
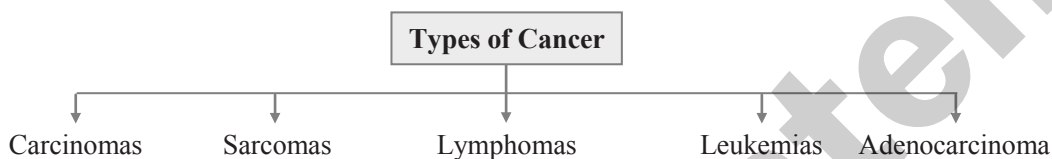
- i. Malaria – Bite of infected mosquito
- ii. Typhoid – Faeco-oral route
- iii. Dermatophytosis – Direct/Indirect skin contact
- iv. Amoebiasis – Faeco-oral route

### QUICK REVIEW

| No.  | Disease   | Causative organism  | Symptoms  |
|------|-----------|---|---|
| i.   | Typhoid   | <i>Salmonella typhi</i>   | Prolonged fever, general nausea, fatigue, headache, abdominal pain, constipation, diarrhoea, rose coloured rash, white coat on tongue, anorexia                       |
| ii.  | Pneumonia | <i>Streptococcus pneumoniae</i><br>Virus: RSV, influenza virus, para influenza virus, adenovirus<br>Fungus: <i>Pneumocystis carinii</i> | Cough (yellow/ greenish sputum), high fever, shortness of breath, chest pain, loss of appetite, fatigue, breathlessness, headache, vomiting, joint pains, muscle ache |
| iii. | Malaria   | <i>Plasmodium vivax</i> , <i>Plasmodium malariae</i> ,<br><i>Plasmodium falciparum</i> , <i>Plasmodium ovale</i>                        | Fever, headache, chills, cyclic fever, sweating, sudden shivering   |



|       |                           |  |   |
|-------|---------------------------|--|---|
| iv.   | Amoebiasis                | <i>Entamoeba histolytica</i>   | Diarrhoea, flatulence, stool with mucous and abdominal cramps, passing blood with stool   |
| v.    | Ascariasis                | <i>Ascaris lumbricoides</i>  | Gastrointestinal discomfort, presence of live worms in faeces, pulmonary disorders, loss of appetite, weight loss, eosinophilia |
| vi.   | Elephantiasis /filariasis | <i>Wuchereria bancrofti</i> ,<br><i>Wuchereria malayi</i>                    | Edema with thickening of skin and underlying tissue, enlargement of lymph vessels and nodes, lymphedema, hydrocele              |
| vii.  | Ringworm                  | Fungi – <i>Microsporium</i> ,<br><i>Trichophyton</i> , <i>Epidermophyton</i> | Appearance of dry, scaly lesions on different body parts like skin, scalp and nails, etc.                                       |
| viii. | Common cold               | Rhinoviruses, coronaviruses  | Nasal congestion and discharge, sore throat, cough, headache, tiredness, etc.   |



**EXERCISE**

**10.0 Introduction**

- Define infectious diseases. **[1 Mark]**  
**Ans:** Refer Q.1 (ii-a)
- What is health? **[1 Mark]**  
**Ans:** Refer Q.1 (i)

**10.1 Immunity**

- What is innate immunity? Explain different barriers of innate immunity system. **[Mar 08]**  
**Ans:** Refer Q.7 (i)
- Write a note on lymphocytes. **[2 Marks]**  
**Ans:** Refer Q.11 (i)
- Define immunity. **[1 Mark]**  
**Ans:** Refer Q.5 (ii)
- Define antibody. **[1 Mark]**  
**Ans:** Refer Q.6 (ii)
- Write a note on ‘artificial acquired active immunity’. **[2 Marks] [Mar 16]**  
**Ans:** Refer Q.7 (ii- a-2)

- Name the type of T-lymphocyte which secretes perforins. **[1 Mark] [July 17]**  
**Ans:** Refer Q.11 (i-h-2)
- Give any two unique features of acquired immunity. **[3 Marks] [July 16]**  
**Ans:** Refer Q.8 [Any two features]
- The helper T cells have recognized pathogen. How would antibody molecules be generated? **[2 Marks]**  
**Ans:** Refer Q.13
- Mention the advantages of vaccination. **[2/3 Marks]**  
**Ans:** Refer Q.18

**10.2 Structure of Antibody**

- Rita is AB Rh+ve. What are the antigens that would be present on her RBCs? Explain them. **[4 Marks]**  
**Ans:** Refer Q.28
- Sketch and label the structure of antibody. **[2 Marks] [Mar 18]**  
**Ans:** Refer Q.23

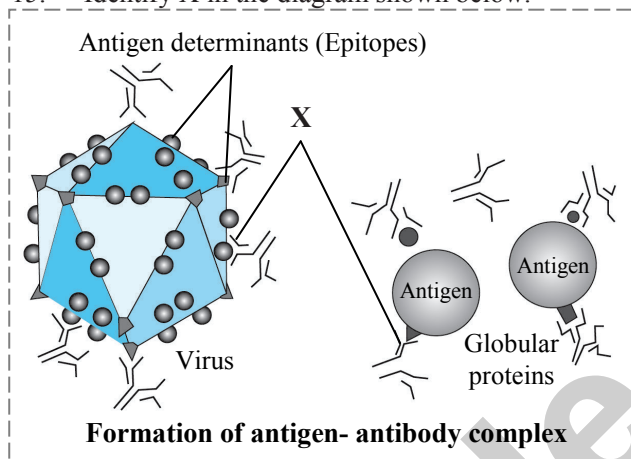
14. Complete the following chart and rewrite:

| Blood Group | Genotype               | Antigen on the Surface of RBC | Antibody in serum |
|-------------|------------------------|-------------------------------|-------------------|
| A           | $I^A I^A$ or $I^A I^O$ | –                             | –                 |
| –           | $I^B I^B$ or $I^B I^O$ | B                             | a                 |
| AB          | –                      | A and B                       | (Nil)             |
| –           | $I^O I^O$              | (Nil)                         | –                 |

[3 Marks] [July 22]

Ans: Refer Q.28

15. Identify X in the diagram shown below.



Ans: Refer Q. 26.

16. Write a note on hemolytic disease of the newborn (HDN). [2 Marks]

Ans: Refer Q. 31.

### 10.3 Common Human Diseases

17. Draw a neat labelled diagram of the lifecycle of *Plasmodium*. [3 Marks]

Ans: Refer Q.43 (Diagram)

18. Mention any four measures that should be taken to prevent spread of infectious diseases. [2 Marks]

Ans: Refer Q.38. [Any four points]

19. Define congenital diseases. [1 Mark]

Ans: Refer Q.35 (i)

20. Draw the life cycle of *Entamoeba histolytica*. [3 Marks]

Ans: Refer Q.48.

21. Rashmi has been diagnosed with Ascariasis. What are the possible symptoms the doctor might have seen to diagnose her case? [2 Marks]

Ans: Refer Q.56

22. Name the causative organism of 'typhoid' and draw its diagram. [2 Marks] [Mar 18]

Ans: Refer Q.65

23. How can malaria be prevented? [1 Mark]

Ans: Refer Q.45.(iii)

24. Give any 'two' modes of transmission of amoebiasis. [1 Mark] [Oct 14]

Ans: Refer Q,49(ii)

25. Describe the life cycle of *Ascaris*. [2 Marks]

Ans: Refer Q.55

26. Give the causative agent, mode of transmission and symptoms of typhoid. [3 Marks] [Mar 22]

Ans: For causative agent : Refer Q.64

For mode of transmission: Refer Q.67

For symptoms: Refer Q.66

27. What are the signs and symptoms of lymphatic filariasis? [2 Marks]

Ans: Refer Q.61.

28. Describe the life cycle of *Wuchereria bancrofti*. [3/4 Marks]

Ans: Refer Q.62

29. Pravin's Widal Test was positive. Which disease is he suffering from? What are its symptoms? [3 Marks]

Ans: Refer Q.66 and 68

30. Enlist the symptoms of pneumonia. [2 Marks]

Ans: Refer Q.75.

31. Cancer is caused due to which factors? Explain. [3 Marks]

Ans: Refer Q.100

32. Write a note on HIV. [3 Marks] [Oct 14]

Ans: Refer Q.106, Q.107, Q.108 and Q.109

33. Mention the symptom of dermatophytosis. [2 Marks]

Ans: Refer Q.87

34. Which is the vector of dengue? [1 Mark]

Ans: Refer Q.90 (ii)



35. i. Name the process in which a tumour successfully spreads to the other parts of the body, grows and destroys healthy tissues.

[1 Mark] [July 19]

ii. Write a note on malignant cancer. [2 Marks]

Ans:

i. Refer Q.97 (Malignant cancer – iii)

ii. Refer Q.97 (Malignant Cancer)

36. Name the term for the transmission of HIV from pregnant mother to foetus. [1 Mark] [Mar 13]

Ans: Refer Q.109 (iii)

37. Enlist the various types of cancer.

[3 Marks] [Mar 15]

Ans: Refer Q.98

38. Mention the organs affected by the following carcinogens: [1 Mark Each]

- |             |                 |
|-------------|-----------------|
| i. Asbestos | ii. Mustard gas |
| iii. Soot   | iv. Aflatoxin   |

Ans: Refer Q.103

39. Sketch and label the ‘structure of HIV’.

[2 Marks] [Mar 17]

Ans: Refer Q.106

40. Name the causative agent of malaria. State any two symptoms and two preventive measures of malaria. [3 Marks] [Mar 20]

Ans: Refer Q.39, 41 (ii) and 45 (iii)

41. With appropriate terms, complete the following chart and rewrite it. [2 Marks] [July 23]

| Sr. No. | Name of disease | Name of pathogen             |
|---------|-----------------|------------------------------|
| 1       | —?—             | <i>Entamoeba histolytica</i> |
| 2       | Typhoid         | —?—                          |
| 3       | —?—             | <i>Wuchereria bancrofti</i>  |
| 4       | —?—             | <i>Plasmodium species</i>    |

Ans: Refer Quick Review

#### 10.4. Adolescence

42. What are the changes observed in the later period of adolescence? [1 Mark]

Ans: Refer Q.118 (iii)

43. Mention the emotional and social changes observed during adolescence. [2 Marks]

Ans: Refer Q.117 (iii)

#### 10.5 Addiction

44. What are the common causes of substance abuse in teenagers? [2 Marks]

Ans: Refer Q.122

45. Define addiction. [1 Mark]

Ans: Refer Q.121

#### 10.6 Drug Abuse

46. Give the adverse effects of opioids, cannabinoids and morphines on human health. [3 Marks] [Mar 13]

Ans: Refer Q.124

47. What is drug dependence? [1 Mark]

Ans: Refer Q.129

48. Enlist any four effects of drug/ alcohol abuse. [2 Marks]

Ans: Refer Q.130 [Any four effects]

#### MULTIPLE CHOICE QUESTIONS

[1 Mark Each]

- \*1. Innate immunity is provided by \_\_\_\_\_
  - (A) phagocytes
  - (B) antibody
  - (C) T- Lymphocytes
  - (D) B- Lymphocytes
- \*2. The antiviral proteins released by a virus-infected cell are called \_\_\_\_\_
  - (A) histamines
  - (B) interferons
  - (C) pyrogens
  - (D) allergens
3. Cellular factors in innate immunity is provided by \_\_\_\_\_. [Mar 22]
  - (A) phagocytes
  - (B) antibody
  - (C) T - lymphocyte
  - (D) B - lymphocyte
- \*4. Both B-cells and T-cells are derived from \_\_\_\_\_.
  - (A) lymph nodes
  - (B) thymus glands
  - (C) liver
  - (D) stem cells in bone marrow
5. T-lymphocytes mature in
  - (A) thymus
  - (B) thyroid
  - (C) liver
  - (D) spleen





6. Perforins are secreted by \_\_\_\_\_. [July 23]  
(A) Helper T-cells  
(B) Cytotoxic T-cells  
(C) Suppressor T-cells  
(D) Memory T-cells
7. Study of interaction of antigen and antibody in blood is  
(A) hematology (B) serology  
(C) microbiology (D) histology
8. Antigens are found  
(A) inside cytoplasm  
(B) inside nucleus  
(C) on nuclear envelope  
(D) on cell surface
9. Antigenic determinants of an antigen that are recognized by antibody are  
(A) Paratopes  
(B) Epitopes  
(C) Isotopes  
(D) Non-determinants
10. Antibodies are  
(A) glycoproteins (B) carbohydrates  
(C) lipids (D) nucleic acids
11. The cells active in production of antibodies are  
(A) Kupffer cells  
(B) Plasma cells  
(C) Mast cells  
(D) Langerhans cells
12. Antibody producing plasma cells are derived from  
(A) Memory T-cells  
(B) Suppressor T-cells  
(C) Helper T-cells  
(D) B-lymphocytes
- \*13. An antibody is \_\_\_\_\_.  
(A) molecule that binds specifically to an antigen  
(B) WBC which invades bacteria  
(C) secretion of mammalian RBC  
(D) cellular component of blood
14. What will be the parents blood groups if the blood group of a child is AB? [Mar 13]  
(A) A and O (B) B and O  
(C) AB and O (D) A and AB
15. A person having blood group 'AB' has  
(A) antibody b  
(B) antibody a  
(C) no antibody  
(D) both antibody a and b
16. Genotype of blood group 'AB' in human is \_\_\_\_\_. [Mar 20]  
(A)  $I^A I^B$  (B)  $I^B i$   
(C)  $I^A I^A$  (D) ii
17. Erythroblastosis foetalis is caused when mother is \_\_\_\_\_. [Mar 16]  
(A) Rh+ve  
(B) with antibody 'a'  
(C) Rh-ve  
(D) with antibody 'b'
18. Following is a protozoan disease  
(A) Malaria (B) Typhoid  
(C) AIDS (D) Cholera
19. \_\_\_\_\_ is the infectious stage of *Plasmodium*. [July 17]  
(A) Trophozoite (B) Sporozoite  
(C) Cryptozoite (D) Metacercaria
20. Which disease is caused by nematode?  
(A) Malaria (B) Ascariasis  
(C) Leprosy (D) Amoebiasis
- \*21. Elephantiasis is caused by \_\_\_\_\_. [Oct 15]  
(A) *W. bancrofti* (B) *P. vivax*  
(C) Bedbug (D) Elephant
- \*22. Which of the following is NOT caused by unsterilized needles?  
(A) Elephantiasis (B) AIDS  
(C) Malaria (D) Hepatitis B
23. Typhoid is caused by  
(A) *Salmonella* (B) *Plasmodium*  
(C) *Streptococcus* (D) *Brugia*
24. The oral vaccine for prevention of typhoid recommended by WHO is \_\_\_\_\_. [July 22]  
(A) typhoid polysaccharide  
(B) typhin V  
(C) typherix  
(D) Ty2la
- \*25. Which of the following diseases can be contracted by droplet infection?  
(A) Malaria (B) Chicken pox  
(C) Pneumonia (D) Rabies



26. Common cold is also called as  
 (A) nasopharyngitis  
 (B) acute viral rhinopharyngitis  
 (C) acute coryza  
 (D) all of the above
27. Ringworm is \_\_\_\_\_ disease.  
 (A) fungal (B) bacterial  
 (C) viral (D) nematode
28. Leukemia is the  
 (A) mouth cancer (B) lung cancer  
 (C) blood cancer (D) breast cancer
29. The agent that tends to produce cancer is known as  
 (A) Oncogene (B) Carcinoma  
 (C) Carcinogen (D) Metastasis
30. A benign tumour differs from malignant one in that  
 (A) a benign tumour shows metastasis and spreads in the body.  
 (B) it passes on to neighbouring organs to produce acute pain  
 (C) it is enveloped within a capsule  
 (D) all of these
31. HIV replicates in actively dividing  
 (A) suppressor T-cells  
 (B) carrier T-cells  
 (C) helper T-cells  
 (D) killer T-cells
- \*32. Confirmatory test used for detecting HIV infection is \_\_\_\_\_.  
 (A) ELISA (B) Western blot  
 (C) Widal test (D) Eastern blot
33. Cocaine alkaloid is obtained from \_\_\_\_\_ plant. [July 18]  
 (A) Marijuana  
 (B) *Papaver somniferum*  
 (C) *Cannabis sativa*  
 (D) Coca
- \*34. Opium derivative is \_\_\_\_\_.  
 (A) Codeine (B) Caffeine  
 (C) Heroin (D) Psilocybin
35. Charas, hashish and ganja are obtained from [Oct 13]  
 (A) *Papaver somniferum*  
 (B) *Erythroxylum coca*

- (C) *Atropa belladonna*  
 (D) *Cannabis sativa*

36. The stimulant present in tea is \_\_\_\_\_.  
 (A) tannin (B) cocaine  
 (C) caffeine (D) crack
37. Which of the following is caused by smoking?  
 (A) Liver cirrhosis  
 (B) Pulmonary tuberculosis  
 (C) Emphysema  
 (D) Malaria

### ANSWERS TO MULTIPLE CHOICE QUESTIONS

1. (A) 2. (B) 3. (A) 4. (D)  
 5. (A) 6. (B) 7. (B) 8. (D)  
 9. (B) 10. (A) 11. (B) 12. (D)  
 13. (A) 14. (D) 15. (C) 16. (A)  
 17. (C) 18. (A) 19. (B) 20. (B)  
 21. (A) 22. (A) 23. (A) 24. (D)  
 25. (C) 26. (D) 27. (A) 28. (C)  
 29. (C) 30. (C) 31. (C) 32. (A)  
 33. (D) 34. (C) 35. (D) 36. (C)  
 37. (C)

[Note: 22. Though AIDS and Hepatitis are commonly spread through unsterilized needles, malaria is very rarely acquired by needle sharing among intravenous drug users.

34. Psilocybin is a naturally occurring psychedelic prodrug compound produced by more than 200 species of mushrooms.

37. Smoking increases the risk of liver cirrhosis and pulmonary tuberculosis.]

### COMPETITIVE CORNER

1. Identify the CORRECT pair representing the causative agent of typhoid fever and the confirmatory test for typhoid.  
 [NEET (UG) 2019]  
 (A) *Salmonella typhi* / Anthrone test  
 (B) *Salmonella typhi* / Widal test  
 (C) *Plasmodium vivax* / UTI test  
 (D) *Streptococcus pneumoniae* / Widal test
2. What is produced by sensitized helper T-cells?  
 [MHT CET 2019]  
 (A) Lymphokines (B) Lysozyme  
 (C) Perforins (D) Lysin



3. Identify the WRONG statement with reference to immunity. [NEET (UG) P-I 2020]

- (A) When ready-made antibodies are directly given, it is called “Passive immunity”.  
**(B) Active immunity is quick and gives full response.**  
 (C) Foetus receives some antibodies from mother, it is an example for passive immunity.  
 (D) When exposed to antigen (living or dead) antibodies are produced in the host’s body. It is called “Active immunity”.

4. Which one of the following is NOT correct regarding vaccines? [MHT CET 2021]

- (A) It is used to control diseases like measles, polio etc.  
 (B) It is antigenic protection against particular pathogen.  
 (C) It teaches immune system to recognize and eliminate the pathogenic organism.  
**(D) It is introduction of antibodies into animal body.**

5. Given below are two statements with respect to neurotransmitter, dopamine.

**Statement-I:** Degeneration of dopamine producing neuron causes Parkinson’s disease.

**Statement-II:** Dopamine level increases due to cocaine.

Choose the most appropriate answer from the options given below. [MHT CET 2022]

- (A) Both Statement-I and Statement-II are correct.**  
 (B) Both Statement-I and Statement-II are incorrect.  
 (C) Statement-I is correct but Statement-II is incorrect.  
 (D) Statement-I is incorrect but Statement-II is correct.

6. Diacetylmorphine is also called as:

[NEET (UG) 2023 (Manipur)]

- (A) Crack **(B) Smack**  
 (C) Amphetamine (D) Barbiturate

7. Match List I with List II.

| List I |            | List II |                               |
|--------|------------|---------|-------------------------------|
| (a)    | Ringworm   | (i)     | <i>Haemophilus influenzae</i> |
| (b)    | Filariasis | (ii)    | <i>Trichophyton</i>           |
| (c)    | Malaria    | (iii)   | <i>Wuchereria bancrofti</i>   |
| (d)    | Pneumonia  | (iv)    | <i>Plasmodium vivax</i>       |

Choose the CORRECT answer from the options given below: [NEET (UG) 2023]

- (A) a – ii, b – iii, c – i, d – iv  
 (B) a – iii, b – ii, c – i, d – iv  
 (C) a – iii, b – ii, c – iv, d – i  
**(D) a – ii, b – iii, c – iv, d – i**

8. Individuals with blood group “O Rh +ve” have x antigens on the surface of their RBCs and y antibodies in their plasma.

[MHT CET 2023]

|            | x          | y                       |
|------------|------------|-------------------------|
| (A)        | A, B and D | Both ‘a’ and ‘b’        |
| (B)        | Nil        | Only ‘a’                |
| <b>(C)</b> | <b>D</b>   | <b>Both ‘a’ and ‘b’</b> |
| (D)        | A and D    | Nil                     |

9. Following are functions of free antibodies circulating through body fluids EXCEPT \_\_\_\_\_.

[MHT CET 2023]

- (A) phagocytosis of pathogens.**  
 (B) agglutination of particulate matter, bacteria and viruses.  
 (C) neutralization of toxins released by bacteria  
 (D) coating of bacteria for subsequent engulfing by macrophages.

Time: 1 Hour 30 Min

TOPIC TEST

Total Marks: 25

### SECTION A

Q.1. Select and write the correct answer:

[04]

i. Antibodies present in the colostrum of mother’s milk that confer protection to the babies are a form of

- (A) Natural acquired active immunity (B) Artificial acquired passive immunity  
 (C) Natural acquired passive immunity (D) Artificial acquired active immunity



- ii. \_\_\_\_\_ is NOT transmitted through faeco-oral route.  
(A) Amoebiasis (B) Typhoid (C) Ascariasis (D) Filariasis
- iii. Which of the following is an example of passive immunity?  
(A) Rabies vaccine (B) BCG vaccine (C) Polio vaccine (D) All of these
- iv. Which of the following is a symptom of dermatophytosis?  
(A) Conjunctivitis (B) Athlete's foot (C) Rose coloured rash (D) Hydrocele

**Q.2. Answer the following:****[03]**

- i. Which organism is almost exclusively responsible for causing severe malaria?
- ii. What is 'metastasis'?
- iii. What is 'onychomycosis'?

**SECTION B****Attempt any Four:****[08]**

- Q.3. State the drugs used for the treatment of;  
i. Ascariasis ii. Filariasis
- Q.4. What are the symptoms of amoebiasis?
- Q.5. Mention any four derivatives of *Cannabis sativa*.
- Q.6. Write a short note on dengue
- Q.7. Sketch and label the basic structure of an immunoglobulin molecule.
- Q.8. Mention the unique features of acquired immunity.

**SECTION C****Attempt any Two:****[06]**

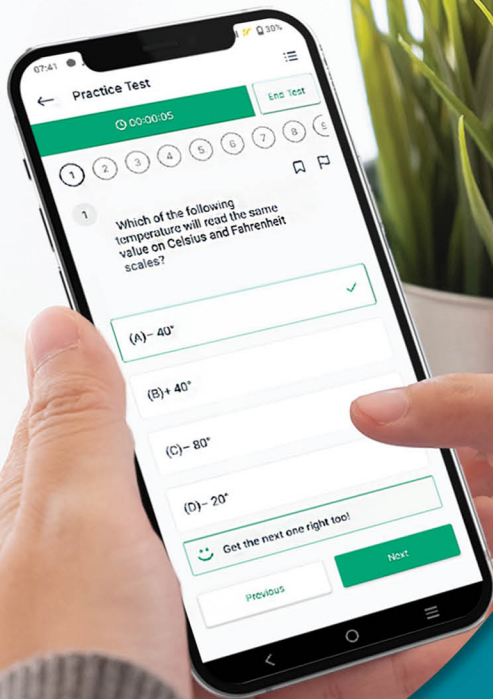
- Q.9. Explain the importance of vaccination.
- Q.10. What is the causative agent of malaria? State the preventive measures that can be followed in order to control its spread.
- Q.11. Explain any three types of cancer based on the part of the body and type of cells they initially affect.

**SECTION D****Attempt any One:****[04]**

- Q.12. What is non-specific immunity? Explain the natural barriers of the immune system.
- Q.13. Draw a neat labelled diagram of HIV. State the common modes of its transmission and the current therapy available for treating AIDS patients.

Scan the given Q. R. Code in *Quill - The Padhai App* to view the solutions of the Topic Test.





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