

**PREVIOUSLY ASKED  
PUBLIC QUESTIONS  
CHAPTER WISE,  
CONTENT WISE AND  
PAGE WISE  
ARRANGED**

- **Underline** or **write in black pen** the key words in your answer booklet.
- **Use** proper **subheading** for the answers.
- Write **point by point** and **one below the other**. Split paragraphs into points.
- **Don't overwrite** letters or words.
- **Avoid spelling mistake.**
- **Don't strike** letters or words or sentences. Think before you ink.
- Leave **two inches** –gap between answers.
- **Draw** straight **lines between answers**.
- **Answer** all the questions **as per instructions in the question paper**.
- **Quote example, wherever needed.**
- **Diagram should not be too large or too small, It must be drawn along with or middle of the answer itself.**

### Time Management

Divide the allotted time into three phases.

- **85 Minutes** for answering the Bio-Botany paper
- **85 Minutes** for answering Bio- Zoology paper
- **10 Minutes** to check the answer

BIO - BOTANY			
	Question Type	Marks	Time (Minutes)
Section A	Choose the best answer	14 X 1 = 14	10
Section B	Short Answer (3 Marks)	7 X 3 = 21	20
Section C	Brief answer (5 Marks)	4 x 5 =20	25
Section D	Detail answer (10 Marks)	2 x 10 = 20	30
To check the answers			5
BIO-ZOOLOGY			
	Question Type	Marks	Time (Minutes)
Section A	Choose the best answer	16 X 1 = 16	10
Section B	Short Answer (3 Marks)	8 X 3 = 24	25
Section C	Brief answer (5 Marks)	3 x 5 =15	20
Section D	Detail answer (10 Marks)	2 x 10 = 20	30
To check the answers			10
Total Time			180

**Section: B (3 Marks)**

1. Write the objectives (aim) of classification of plants. (M-07, J-08, M-11, O-11) (BB) (Pg.1)
2. What is 'Binomial nomenclature'? Give example. (O-07, J-10) (BB) (Pg.4)
3. What is a type specimen? (M-06) (BB) (Pg.4)
4. Explain author citation with example. (J-09, M-10, O-10) (BB) (Pg.5)
5. Define Nomen ambiguous. (S-08) (BB) (Pg.5)
6. Define tautonym. Give example. (J-06, O-06, M-09, J-11) (BB) (Pg.5)
7. Write the three classes of seeded plants or phanerogamous. (J-07, O-09) (BB) (Pg.8)
8. Write any three merits & demerits of Bentham and Hooker's classification. (M-09, J-10) (Pg.10,11)
9. Mention the systematic position of malvaceae. (J-11) (Pg.13)
10. Write any 3 points comparing the androecium of Malvaceae and Solanaceae. (M-10) (Pg.16 &21)
11. Name any three-fiber plants of Malvaceae. (O-07, M-11) (BB) (Pg.16)
12. Write the systematic position of potato family or Solanaceae. (M-08) (BB) (Pg.18)
13. Mention the binomials of three medicinal plants in Solanaceae and state their useful parts. (J-06, J-08, O-10, O-11) (BB) (Pg.21)
14. What is atropine? (S-08) (Pg.21)
15. What are the different types of inflorescences seen in Euphorbiaceae? Give example for each. (M-07, M-08) (BB) (Pg.24)
16. Draw floral diagram for female flower of *Ricinus communis*. (M-06) (BB) (Pg.26)
17. Write the binomial of a) Tapioca b) Castor. (O-09) (Pg.27)
18. Write the systematic position of musaceae. (J-09) (BB) (Pg.29)
19. Explain the structure of androecium of *Musa paradisiaca*. (J-07) (Pg.32)
20. Draw the floral diagram of *Musa paradisiaca*. (O-06) (BB) (Pg.33)
21. What is Cladode? Give example. (M-12)
22. What are the alkaloids found in Tobacco? (M-12)

**Section: C (5 Marks)**

1. Give an account of phylogenetic system of classification. (O-06) (Pg.2)
2. Write any five features of ICBN (M-09, M-11) (BB) (Pg.4)
3. Write the importance of herbarium. (M-06, J-06, M-07, J-08, O-09, M-10, O-10, M-12) (BB) (Pg.6)
4. Discuss the outline of Bentham and Hooker's classification of plants. (O-07, S-08) (BB) (Pg.9)
5. Bring out the merits of Bentham and Hooker's classification. (J-07) (BB) (Pg.10)
6. Write the economic importance of members of Malvaceae. (M-08, J-09) (BB) (Pg.16)
7. Write the economic importance of the family Euphorbiaceae. (J-10, O-11) (BB) (Pg.27)
8. Write the economic importance of Musaceae. (J-11) (Pg.32)

**Section: D (10 Marks)**

1. With the help of flowchart, discuss Bentham & Hooker's classification of plants. (M-08) (BB) (Pg.8)
2. a) Bring out the merits of Bentham and Hooker's classification of plants. (J-11) (Pg.10)  
b) Bring out the significance of herbarium. (J-11) (Pg.6)
3. Describe *Hibiscus rosasinensis* in technical terms. (M-06, O-11) (Pg.14)
4. Describe *Datura metel* in technical terms. (J-06, O-06, S-08, J-09, O-09, M-10, J-10) (BB) (Pg.19)
5. Describe *Ricinus communis* in botanical terms. (O-07, M-11) (BB) (Pg.25)
6. Describe *Musa paradisiaca* in technical terms. Draw its floral diagram and write the floral formula. (J-06, M-07, J-07, M-09, O-10, O-11, M-12) (BB) (Pg.30)

**Chapter – II****Plant Anatomy****Section: B (3 Marks)**

1. Bring out any three characteristics of meristematic cell. (J-08) (Pg.34)
2. What are lateral meristems? (O-11) (Pg.35)
3. Draw the structure of parenchyma and label the parts. (O-07, J-11) (Pg.36)
4. Describe any two types of collenchyma. (M-11) (Pg.36)
5. Draw diagram for Lacunate collenchyma and label its parts. (O-06) (Pg.37)
6. Draw diagram for angular collenchyma and label its parts. (M-07) (Pg.37)
7. Differentiate Sclereids from Fibres. (M-07, O-10) (BB) (Pg.37)
8. What are brachy sclereids? Give example. (J-06) (BB) (Pg.38)
9. Draw diagram, for Brachysclereids and label the parts. (M-06, J-09, O-09, J-10, M-12) (Pg.37)
10. Draw any three types of secondary wall thickenings in tracheids. (O-07, J-07) (Pg.39)
11. Draw the diagram of bicollateral vascular bundle. (J-06, M-09, O-08) (Pg.43)
12. Draw and label the parts of open vascular bundle. (M-10) (Pg.43)
13. Explain bicollateral vascular bundle with example. (O-06, S-08) (Pg.43)
14. Explain endarch and exarch xylem with examples (M-09) (Pg.43)
15. What are passage cells? (M-06, J-09, M-10) (BB) (Pg.46)
16. Draw the ground plan for T.S. of dicot root and label its parts. (J-08, O-10) (Pg.49)
17. Write any three anatomical differences between monocot root and dicot root. (O-07) (Pg.50)
18. What is Protoxylem lacuna? Give an example. (J-10) (BB) (Pg.52)

20. Draw the ground plan for T.S. of sunflower stem and label the parts. (M-08) (Pg.55)
21. Write any three differences between the vascular bundles of dicot stem and monocot stem. (M-11) (Pg.56)
22. Explain dorsiventral leaves with example. (O-07, J-07)(BB) (Pg.58)
23. Write in three sentences about the mesophyll of dicot leaf. or Define mesophyll. (M-08, J-11, M-12) (BB) (Pg.58)
24. Write three differences between the palisade and sponge parenchyma, (O-11) (Pg.59)
25. Define bundle sheath. (S-08) (BB) (Pg.59)

#### **Section: C ( 5 Marks )**

1. Explain the types of meristems based on their positions with diagram. (J-07, M-09, O-09)(BB) (Pg.34)
2. With examples, explain any two types of collenchyma with diagram. (J-08) (Pg.36)
3. Write short notes on vessels. (M-10) (BB) (Pg.38)
4. Write short notes on tracheids. (M-12)
5. Explain the structure of sieve elements. (O-06, M-07, M-11)(Pg.40)
6. Describe the four types of cells in phloem tissues (M-09) (Pg.40)
7. Describe the vascular tissue system with diagram. (O-09) (Pg. 42)
8. With examples, explain the structure of concentric vascular bundles. (M-08) (Pg.43)
9. Draw and label the parts of T.S of monocot root (a sector enlarged). (J-11)(Pg.47)
10. Describe the structure of vascular bundle in monocot stem. (O-10) (Pg.52)
11. Write short notes on vascular bundles of the dicot stem. (O-11) (Pg.54)
12. Differentiate between monocot & dicot root anatomically giving 5 points. (S-08, J-09, 10)(BB)(Pg.50)
13. Draw a neat sketch of anatomy of sunflower leaf and label the parts. (M-06, J-06, O-07) (BB) (Pg.59)

#### **Section: D (10 Marks)**

1. a) Bring out the characters of meristematic cells. (J-11)(Pg.34)  
b) Write the function of epidermal tissue system. (J-11)(Pg.42)
2. Write an account of Sclerenchyma with diagram. (S-08) (BB) (Pg.37)
3. Write an essay on Xylem tissues (O-07) (BB) (Pg.38)
4. Describe the four types of cells in phloem tissues. (M-09) (BB) (Pg.40)
5. Describe the vascular tissue system with diagrams. (O-09, M-12) (BB) (Pg.42)
6. Discuss the anatomy of monocot root with diagram. (J-08) (BB) (Pg.46)
7. Describe the primary structure of a dicot root. (O-11) (Pg. )
8. Describe the primary structure of a monocot stem. (J-06, J-09) (BB) (Pg.52)
9. With help of diagram, describe the anatomy of dicot stem. (M-08, J-07, J-10) (BB) (Pg.54)
10. Write the anatomical differences between the dicotyledonous stem and monocotyledonous stem. (M-06, M-07, M-10) (BB) (Pg.56)
11. Explain the anatomy of Dicot leaf. (O-06, O10, M-11) (BB) (Pg.58)

### **Chapter – III**

### **Cell Biology and Genetics**

#### **Section: B (3 Marks)**

1. Draw the structure of chromosome and label its parts. (J-06, O-06, M-07, O-09, O-10)(Pg.61)
2. Draw different types of chromosomes based on shape and position of centromere. (M-06, J-10) (Pg.62)
3. Draw and label the parts of acrocentric chromosome. (M-10)(Pg.62)
4. Draw the polytene chromosome and label the parts. (J-08, J-09, M-11) (Pg.63)
5. Draw and label the lampbrush chromosome. (S-08, J-11)(Pg.63)
6. Draw t-RNA and label its parts. (J-07, O-07, M-08, M-09, O-11, M-12)(Pg.83)

#### **Section: C (5 Marks)**

1. Write short notes on structure of chromosome. (M-10)(BB) (Pg.61)
2. Explain the types of chromosomes on the basis of shape and position of centromere with diagram. (J-07)(BB) (Pg.62)
3. Describe the special type of chromosomes. (or) With the help of diagrams, describe the structure of polytene & lampbrush chromosomes. (M-08, M-09, O-10) (BB) (Pg.63)
4. What is gene mutation? Describe the types of gene mutation. (or) Write a short note on gene mutation. (J-06, M-07, M-12)(BB) (Pg.71)
5. Write about the significance of mutation. (O-06, J-09)(BB) (Pg.72)
6. Explain translocation chromosomal aberration with the help of diagram. (O-11)(Pg. )
7. Give an account of mutagenic agents. (O-07) (BB) (Pg.72)
8. Explain allopolyploidy with an example. (J-08) (BB) (Pg.76)
9. Write any five significances of ploidy. (M-06)(BB) (Pg.77)
10. Explain the experiment conducted by Fredrick Griffith in *Diplococcus pneumoniae*. (O- 09) (BB) (Pg.79)
11. Write a note on t-RNA with diagram. (S-08, J-10, M-11)(BB) (Pg.83)
12. Write the difference between DNA and RNA. (J-11) (Pg.84)

### **Chapter – IV**

### **Biotechnology**

#### **Section: B (3 Marks)**

1. What is the importance of *Escherichia coli* in biotechnology? (M-07, O-11)(Pg.86)
2. Name the enzymes involved in the making of a DNA hybrid. (J-06)(BB) (Pg.85)
3. What is restriction endonuclease? (M-08, S-08, J-11) (BB) (Pg.85)

5. How do bacteria protect themselves from the attack of viruses? or What is role of restriction enzyme in bacteria? (M-06) (BB) (Pg.87)
6. List down any three genetically engineered products and their functions. (J-07) (Pg.89)
7. What are transgenic plants? Give any two examples. (J-10) (BB) (Pg.90)
8. Write any three transgenic dicotyledonous plants. (O-07) (BB)(Pg.90)
9. Write any three monocot transgenic plants. (M-09) (Pg.90)
10. Write any three benefits obtained by the release of genetically modified organisms into the environment. (J-08) (Pg.92)
11. What is inoculation? (O-09)(BB) (Pg.95)
12. What is morphogenesis? Describe the types. (O-11) (Pg.96)
13. List the important tissue culture centers or biotechnology centers in India. (O-06, J-09) (Pg.96)
14. What is PEG? Write its role. (M-11) (Pg.100)
15. Define SCP. Give an example. (M-10) (BB) (Pg.100)
16. Mention the names of any three algae used for SCP production.(M-07) (Pg.101)
17. What is meant by bio-remediation? (M-12)

#### **Section: C (5 Marks)**

1. Write the basic technique involved in genetic engineering. (J-10) (Pg.85)
2. Explain the steps involved in the production of human insulin by a bacterial cell with diagram. (J-08) (Pg.85)
3. How is DNA cut? (O-07, M-09, O-10) (BB) (Pg.87)
4. Describe with diagram the action of restriction endonuclease enzyme. (M-06)(Pg.88)
5. How are foreign genes introduced into plants? (M-07) (BB) (Pg.90)
6. Write about the electroporation and gene gun methods of introducing foreign gene into plants. (J-09) (Pg.90)
7. Briefly mention the basic concepts involved in plant tissue culture. (M-10) (Pg.94)
8. Give an account of origin of tissue culture. (J-07) (BB) (Pg.94)
9. Write any five outcomes of application of plant tissue culture. (J-06, O-11) (Pg.96)
10. Explain the enzymatic method of isolation of protoplasts. (O-06, S-08, J-11) (BB) (Pg.98)
11. Give an on SCP. (O-09, M-11) (BB) (Pg.100)
12. What is single cell protein? State uses of single cell protein. (M-08, O-09, M-11,M-12) (BB)(Pg.100)

#### **Section: D**

1. Write an essay on DNA recombinant technology. (S-08, M-10, M-12) (BB) (Pg.85)
2. Write an essay on transgenic plants. (O-06) (Pg.90)
3. a)What is role of Bt toxin in crop protection against pest? (O-09) (BB) (Pg.91)  
b) Write any five uses of plant tissue culture. (O-09)(BB) (Pg.96)
4. Explain the basic techniques of plant tissue culture. (M-06, M-07, O-07, M-08, M-09, M-10, O-10, M-11)(BB) (Pg.94)
5. What are the outcomes of application of plant tissue culture? (J-11) (Pg.96)
6. With the help of diagram, describe the process of protoplasmic fusion. or Explain as to how protoplasmic fusion can bring about somatic hybridization in plants. (J-08, O-11) (BB) (Pg.98)
7. Give an account of single cell protein. (J-06) (BB) (Pg.100)
8. a) Write about the use of genetically engineered bacterial strain by Ananda mohan chakraborty.  
b) Write the benefits from release of genetically modified microorganism into the environment. (J-07)

### **Chapter – V**

### **Plant Physiology**

#### **Section: B (3 Marks)**

1. List the photosynthetic pigments.(M-09) (Pg.105)
2. What is photolysis of water? (M-06, J-06, O-06, O-09, M-11) (BB) (Pg.106)
3. What is photophosphorylation? (M-08)(Pg.106)
4. Write the chain of electron carriers in electron transport system. (M-09) (Pg.106)
5. Write the overall reaction of photosynthesis. (J-10, O-10) (BB)(Pg.106)
6. State the conditions under which cyclic photophosphorylation occur. (J-07, J-08, J-09, M-10)(BB)(Pg.108)
7. What are dimorphic chloroplasts? (J-08) (BB) (Pg.112)
8. Write three differences between  $C_3$  and  $C_4$  pathway. (O-11) (Pg.114)
9. Define  $C_2$  cycle. (O-09) (BB) (Pg.114)
10. Write any three differences between photorespiration and dark respiration. (M-06, M-07, O-07,S-08, J-10, O-10, M-12) (BB) (Pg.116)
11. What is energy currency of a cell? Why is it called so? (O-11) (Pg.124)
12. What are insectivorous plants? Give an example. (M-08) (Pg.120)
13. Explain total parasite with an example. (J-09)(BB) (Pg.120)
14. Write about the structure of ATP.(J-08)(Pg.124)
15. Explain the role of aconitase in Kreb's cycle. (J-09)(BB) (Pg.128)
16. Write the role of following enzymes in respiration a) aldolase b) succinyl CoA synthetase. (M-11) (Pg.128)
17. Define Chemosynthesis. (J-11) (Pg.120)
18. Write any three significance of pentose phosphate pathway. (M-12) (Pg.133)
19. Explain respiratory quotient.(J-06, O-06)(BB) (Pg.134)
20. The respiratory quotient of a carbohydrate molecule is one. How? (M-07) (Pg.134)



22. Define fermentation. (M-09) (Pg.135)
23. What are the three phases of sigmoid curve? (O-09) (Pg.138)
24. Write any three physiological effects of Abscicic acid. (J-11) (Pg.140)
25. What is apical dominance? (O-11) (BB) (Pg.140)
26. Mention any three physiological effects of cytokinin.(J-07)(Pg.141)
27. Write any three physiological effects of Gibberellin. (M-07) (Pg.141)
28. What is Richmond-Long effect? (M-06, O-07, M-10, J-11)(BB) (Pg.141)
29. Define 'bolting'.(J-06, S-08, M-11, M-12)(BB) (Pg.141)
30. Define growth inhibitors. Give an example. (J-10, O-10) (Pg.142)
31. Explain long day plants and short day plants with examples. (O-06)(BB) (Pg.145)
32. What is vernalization? (S-08)(BB) (Pg.145)
33. Write down the advantages of vernalization.(J-07) (BB) (Pg.146)
34. Is it possible to shorten the time of crop maturity? Support your answer. (O-07) (Pg.146)

#### **Section: C (5 Marks)**

1. Describe the structure of chloroplast.(O-07, J-09)(BB) (Pg.104)
2. Explain cyclic photophosphorylation. (M-06, O-11) (Pg.108)
3. Write the differences between cyclic photophosphorylation and non-cyclic photophosphorylation. (M-07, J-07, O-09, O-10) (Pg.108)
4. Bring out any five significances of photosynthesis. (J-08) (BB) (Pg.103)
5. Draw  $C_4$  cycle without explanation. (O-07)(Pg.113)
6. Write a short note on Ganong's light screen experiment.(S-08, J-10)(BB) (Pg.117)
7. What are the differences between  $C_3$  and  $C_4$  pathways? (O-06, J-11)(BB) (Pg.114)
8. Explain the test tube and funnel experiment to demonstrate that oxygen is evolved during photosynthesis. (J-09) (BB) (Pg.117)
9. Explain Ganong's respiroscope experiment.(J-06,J-07,M-09, M-12) (BB) (Pg.131)
10. Write the significance of pentose phosphate pathway. (M-11) (Pg.133)
11. Explain respiratory quotient.(M-06) (BB) (Pg.134)
12. Explain Kuhne's fermentation experiment with diagram. (J-08, O-09) (Pg.135)
13. Explain the experiment to measure the actual longitudinal growth of plant by lever auxanometer. (or) Explain the experiment to measure growth in length of a plant. (M-07) (M-08)(BB) (Pg.138)
14. Explain the different phases of growth with sigmoid curve. (M-10) (BB) (Pg.138)
15. State or Bring out the physiological effects of Auxin. (J-08, S-08, M-10) (BB) (Pg.140)
16. Write any five physiological effects of gibberellins. (O-10, O-11) (Pg.141)
17. Bring out the physiological effects of cytokinin. (M-09) (BB) (Pg.141)
18. List the physiological effects of ethylene. (O-06, M-11) (BB) (Pg.142)
19. Write a short note on vernalization. (J-06, J-11) (BB) (Pg.145)

#### **Section: D (10 Marks)**

1. Describe the light reaction of photosynthesis.or Explain cyclic and noncyclic photophosphorylation. (J-06) (BB) (Pg.106)
2. Draw (or) Explain Calvin cycle or Write an account on dark reaction of photosynthesis. (Explanation or Flow chart) (M-11, O-09) (BB) (Pg.109)
3. Describe Hatch and slack pathway of carbon dioxide fixation in plants with flowchart. (or) Write an essay on  $C_4$  pathway. (J-08) (BB) (Pg.112)
4. Draw  $C_4$  Cycle without explanation. (M-09) (BB) (Pg.112)
5. Write an essay on photorespiration or  $C_2$  cycle. (M-07) (BB) (Pg. 114)
6. a) Write the significance of pentose phosphate pathway. (J-09) (Pg.133)  
b) Write short notes on Insectivorous plants. (J-09) (Pg.120)
7. What is glycolysis? Explain the steps involved in it. (Explanation or Flowchart) (O-07, J-09, M-10, J-11, M-12)(BB) (Pg.126)
8. Draw Kreb's cycle without explanation. (or) Explain Kreb's cycle.(Explanation or Flowchart) (O-06,J-07, M-08, J-10, M-10, O-10, O-11) (BB) (Pg.128)
9. Explain pentose phosphate pathway. (S-08) (BB) (Pg.132)
10. a) Write any five physiological effects of Auxin. (M-06) (BB) (Pg.140)  
b) Describe with examples any two types of heterotrophic nutrition in angiosperms. (M-06)(BB)(pg.118)

### **Chapter – VI**

### **Biology in human welfare**

#### **Section: B (3 Marks)**

1. Write about pureline selection.(J-07)(Pg.149)
2. Define clonal selection. (S-08) (Pg.149)
3. What is heterosis? (M-06, J-10, O-11) (Pg.150)
4. What is soil reclamation? (M-08)(Pg.153)
5. What are bio-pesticides? (J-11) (Pg. 156)
6. What are edible interferons? (M-07) (Pg.158)
7. What is bio-piracy? (J-08, M-11, M-12) (Pg.159)
8. Mention any two unique facets of Bio-patency. (J-06) (Pg.160)

10. What is humulin? (O-07, M-09, O10) (BB)(Pg.166)  
11. What is rice bran oil? Write any two uses of it. (M-10) (Pg.167)

**Section: C (5 Marks)**

1. Write any five aims of plant breeding. (J-06, O-06, O-07, O-09, J-11) (BB) (Pg.148)
2. Write a note on plant introduction. (M-07) (BB) (Pg.149)
3. Write any five benefits of biofertilizers. (J-09, J-10, O-11) (Pg.153)
4. Give an account of Tikka disease of groundnut. (J-07, M-08) (Pg.155)
5. Write a short note on Bio-patent. (J-08) (Pg.160)
6. Write short notes on microbes in medicine. (S-08, M-12) (BB) (Pg.166)
7. What is antibiotic? Write any two names of antibiotics. State their uses. (M-06) (Pg.166)
8. Write any five economic importance of rice. (O-10) (Pg.167)
9. Bring out the economic importance of groundnut. (M-10) (Pg.167)
10. Write any five economic importance of cotton. (M-09) (Pg.168)
11. Bring out the economic importance of teak. (M11) (Pg. 168)

**BIO-ZOOLOGY**

**Chapter – I**

**Human Physiology**

**Section: A (Choose the correct answer)**

**Section: B (3 Marks)**

1. Classify monosaccharides. (M-10) (Pg.2)
2. List out the essential amino acids. (M-07, M-11) (BB) (Pg.3)
3. What is kwashiorkor? Mention its symptoms. (J-06,S-08) (BB) (Pg.4)
4. What is PUFA? Give an example. (O-07) (BB) (Pg.4)
5. Mention the symptoms of "Marasmus" (M-09, J-11) (Pg.4)
6. Mention the symptoms of pellagra. (M-06) (Pg.6)
7. What is obesity? (M-08) (BB) (Pg.8)
8. Define Basal Metabolic Rate (BMR) (M-11) (Pg.54)
9. What are the enzymes present in the pancreatic juice? (J-10) (Pg.11)
10. Mentions the different types of Hernia. (J-09) (Pg.14)
11. What is Rheumatic arthritis? (O-09) (Pg.18)
12. Write the characteristics of Osteomalacia. (O-06) (Pg.19)
13. Name the muscles involved in respiration. (J-11) (Pg.27)
14. What is Herring-Breuer Reflex? (O-06, M-09) (BB) (Pg.29)
15. What is called Bronchitis? Mention its types. (J-07) (Pg.30)
16. What are the symptoms and signs of pneumonia? (O-11) (Pg.30)
17. What is silent infraction? (J-10) (Pg.33)
18. What is Angiogram? (J-08) (Pg.34)
19. What is called coronary angioplasty? (J-07) (BB) (Pg.34)
20. What is called cardio-pulmonary resuscitation? (O-10, M-12)(Pg.38)
21. Write any three functions of cerebrospinal fluid. (O-09) (Pg.49)
22. Enumerate the character of myxedema. (O-10)(Pg.55)
23. What is optometry? (M-06) (Pg.65)
24. What is Cataract? Mention its types. (J-06, M-07) (Pg.65)
25. Identify two reasons for cataract. (O-07) (BB) (Pg.66)
26. Suggest any three methods for eye care. (O-11) (Pg.67)
27. Draw the diagram of Urea Biosynthesis (Ornithine cycle) (S-08) (Pg.77)
28. What is corpus luteum? (M-08) (Pg.88)
29. Write three phases of menstrual cycle. (J-09) (Pg.88)
30. Mention the function of corpus luteum. (M-10) (Pg.88)
31. What is tubectomy? (M-12)
32. What is vasectomy? (J-08) (Pg.92)

**Section: C (5 Marks)**

1. Describe the process of absorption and assimilation of digested food. (M-10) (Pg.12)
2. Give an account of root-canal treatment. (M-07, S-08, M-11) (BB) (Pg.13)
3. Explain the different types of bone fracture. (O-07, J-08) (BB) (Pg.15)
4. Explain the mechanism of healing of fractured bone. (O-10) (Pg.17)
5. Give an account of origin and conduction of heartbeat. (J-06, J-07, O-11) (Pg.31)
6. Describe the mechanism of blood clotting. (J-09) (Pg.40)
7. Write down the various types of memory.(M-06, J-11) (BB) (Pg.45)
8. "State is asleep of unconsciousness" substantiate the statement. (M-12)
9. Explain briefly right and left-brain concept. (O-06) (BB) (Pg.48)
10. Write the brief account of cerebrospinal fluid and its function. (J-10) (BB) (P)age No.-49)
11. Draw the V.S.of human eye and lable the parts. (M-08) (Pg.62)
12. Write notes on human eye defects like myopia and hypermetropia. (O-08) (Pg.64)
13. Enumerate the functions of skin. (M-09) (Pg.73)

1. Write an essay on Vitamins. (O-09) (Pg.4)
2. Explain the digestive process taking place in small intestine. (J-07, J-08, J-10, J-11, O-11, M-11) (BB) (Pg.10)
3. What is meant by dental carries? Write its cause, symptoms and root canal treatment. (O-10) (BB) (Pg.12)
4. Define bone fracture and explain the different types of bone fracture. (M-08) (Pg.15)
5. Describe the structure of a skeletal muscle with simple diagram. (M-09, M-11) (Pg.20)
6. Explain the process of pulmonary respiration with the help of diagram. (J-09) (Pg.25)
7. Explain the process of inspiration and expiration. (or) Describe the mechanism of breathing with proper illustration. (O-06, M-07, O-07, S-08) (BB) (Pg.27)
8. Describe the origin and conduction of heart beat and cardiac cycle. (M-10) (Pg.30)
9. Write an essay on myocardial infarction. (M-06) (Pg.33)
10. Enumerate the events involved in the function of the human heart. (M-08) (BB) (Pg.30)
11. Explain the structure and functions of thyroid gland with diagram. (J-09) (Pg.53)
12. Give an account of parathyroid gland. (J-10, J-11) (Pg.55)
13. Explain the importance of Pancreas as an endocrine gland. (J-08) (Pg.56)
14. Explain the physiological effects of insulin and glucagons. (O-07) (Pg.57)
15. Explain how adrenal medulla functions as an endocrine gland. (M-09) (Pg.59)
16. Write an essay on the functions of adrenal secretions. (J-07) (Pg.59)
17. Enumerate the various eye defects. Comment on corrective measures. (J-06, M-11) (BB) (Pg.64)
18. Explain the type of hearing loss and the correcting measures adopted. (M-10) (Pg.70)
19. Explain the mechanism of urine formation. (M-06, M-07) (Pg.77)
20. What is Diabetes mellitus? Explain its symptoms, types and causes. (O-09) (Pg.82)
21. Write an essay on menstrual cycle. (O-06, O-08, O-10, O-11, M-12) (BB) (Pg.88)
22. Comment on various schemes suggested by the National Family Welfare Programmes & their importance. (J-06) (BB) (Pg.90)

## **Chapter – II**

## **Microbiology**

### **Section: B (3 Marks)**

1. Write the crowning achievements of Louis Pasteur. (M-11) (Pg.93)
2. What are viruses? Why are they referred to as obligate- intracellular parasites? (J-07) (Pg.94)
3. What is meant by Diploid cell strain? (M-06, O-11) (BB) (Pg.96)
4. Comment on continuous cell line culture of virus. (O-09, O-10) (Pg.96)
4. What is meant by Chicken Embryo Technique? (M-08) (Pg.96)
5. List out the names of any three oncogenic viruses. (M-09) (Pg.97)
6. Mention the various Morphological features of bacteria. (J-08) (Pg.98)
7. What is transduction? (M-12) (Pg.99)
8. Write the symptoms of cholera. (M-08) (Pg.100)
8. Write notes on Gastroenteritis. (J-09) (Pg.100)
9. What is amoebiasis? (O-06) (BB) (Pg.101)
10. Write the names of any three protozoan parasites and their disease. or Mention any three pathogenic protozoans. (J-06, J-10) (Pg.102)
11. Define Zoonoses. (O-07) (BB) (Pg.102)
12. Write any three characteristics of a good chemotherapeutic agent. (S-08) (Pg.103)
13. Enumerate the methods of diagnosis of AIDS. (M-07, J-11) (BB) (Pg.106)

### **Section: C (5 Marks)**

1. Write the pathogen, symptoms and mode of transmission of Rabies and Cholera (M-10) (Pg.97, 100)
2. Write short notes on any two viral diseases in man. (J-09) (BB) (Pg.97)
3. Write short notes on viral diseases in man. (M-07) (BB) (Pg.97)
4. Mention the steps involved in the preparation of bacteriological media. (O-09, J-10) (Pg.98)
5. Write notes on 'Bacterial Genetics'. (O-10) (Pg.99)
6. Describe any two bacterial sexually transmitted diseases in man. (J-07, M-11) (Pg.100)
7. Write notes on two bacterial diseases in man. (J-08) (Pg.100)
8. Enumerate the adaptations of pathogenic microbes. (M-06, O-07, J-11, O-11) (BB) (Pg.102)
9. Describe the structure of HIV virus. (M-09) (Pg.105)
10. Explain the control and management (preventive measures) of AIDS. (J-06, S-08, M-12) (BB) (Pg.106)
11. Write the symptoms of AIDS, defined by WHO. (O-06, M-08) (BB) (Pg.106)

## **Chapter – III**

## **Immunology**

### **Section: B (3 Marks)**

1. How do interferon acts as physiological barriers in our body? (M-11) (Pg. 109)
2. What is phagocytosis? Mention the important phagocytes. (S-08, O-09) (BB) (Pg.109)
3. How are macrophages acts as phagocytic barriers? (M-10) (Pg.109)
4. Define Cell Mediated Immunity (CMI). (J-06) (BB) (Pg.110)
5. Write any three unique features of specific immunity. (J-09) (Pg.110)
6. What are the main functions of free antibodies? (O-06, J-09, O-10, M-11, M-12) (BB) (Pg.111)
7. Define opsonisation. (O-11) (Pg.111)



9. What is the primary function of the "Thymus"? (M-09) (Pg.113)
10. Name the secondary lymphoid organs. (M-07) (Pg.114)
11. Distinguish between paratope and epitope. (M-07) (BB) (Pg.115)
10. State the functions of spleen. (J-10, J-11, O-11) (BB) (Pg.115)
11. Define the term 'antigen'. (O-06, J-11) (BB) (Pg.115)
12. What are haptens? (O-07, J-08, O-10) (BB) (Pg.115)
13. Name the five classes of immunoglobulins. (M-08) (BB) (Pg.116)
14. Comment on 'L' chain of immunoglobulin. (M-06) (Pg.116)
15. Draw the diagram of immunoglobulin and mark the parts. (J-07) (BB) (Pg.116)
16. Write any three effects of graft rejection in a host. (O-08) (Pg.117)
17. Define Xenograft. (O-07) (BB) (Pg.117)
18. Write any three preventive measures for graft rejection. (M-10) (Pg.118)
19. What are immuno-suppressant drugs? (J-07) (BB) (Pg.118)
20. What is anaphylaxis? (O-09, M-12) (Pg.119)
21. When do autoimmune diseases occur? Give an example. (J-08) (Pg.119)
22. How is the multiple sclerosis formed? (M-09) (Pg.119)

#### **Section: C (5 Marks)**

1. What are the anatomical and inflammatory barriers in first line defence? (J-07) (Pg.109)
2. Explain the unique features of the adaptive immunity. (S-08) (BB) (Pg.110)
3. Write a short note on antibody mediated immunity. (M-06) (Pg.111)
4. Write short notes on activation of adaptive immunity. (M-10) (Pg.111)
5. Describe the structure of lymph node with the help of diagram. (O-10) (Pg.113)
6. Describe the structure of immunoglobulin with a diagram. (J-09, J-10) (Pg.116)
7. Draw a labeled diagram of Immunoglobulin (IgG) (J-06, J-10) (BB) (Pg.116)
8. What is organ transplantation? Classify the types of graft. (J-08) (Pg.117)
9. Describe the types of grafts. (M-09) (Pg.117)
10. Write short notes on genetic basis of organ transplants. (M-11) (Pg. 117)
11. What are the symptoms of graft rejection? or What are the symptoms of allograft rejection? How it is prevented in clinical field? (O-06, M-07, O-07, O-09, J-11, O-11, M-12) (BB) (Pg.118)
12. Give an account of immunodeficiency diseases. (M-08) (BB) (Pg.119)

#### **Chapter – IV**

#### **Modern Genetics**

#### **Section: B (3 Marks)**

1. What is Karyogram? (O-07) (Pg.120)
2. Write any two uses of Karyotyping of Human Chromosomes. (J-06, M-7, M-08, O-11) (BB) (Pg.122)
3. Define recombinant DNA. (M-09) (Pg.124)
4. Write any three uses of recombinant DNA technology. (O-09) (Page N0.-124)
5. What is called pedigree analysis? (O-06, M-10, O-10) (Pg.125)
6. What is meant by pedigree chart? (M-11) (Pg.125)
7. Mention the names of genetic diseases. (M-07) (Pg.125)
8. What are the symptoms of sickle cell anaemia? (O-09) (Pg.125)
9. What are the clinical manifestations of Thalassemia? (J-07, J-08, S-08, J-10, M-11, J-11) (BB) (Pg.125)
10. What is human genome project (HGP)? (M-12) (Pg.128)
11. What is proteomics? (O-07, O-09, J-10) (Pg.128)
12. Define cloning. (M-08) (Pg.129)
13. What is differentiation? (M-10, M-12) (BB) (Pg.129)
14. What are superbugs? Mention any one use of them. (M-06, J-11) (Pg.129)
15. Write the significance of superbugs. (M-09) (BB) (Page N0.-129)
16. What are the merits of Cloning? (J-09) (Pg.130)
17. Mention any two demerits of cloning. (J-08) (Pg.130)
18. What are the uses of transfected cell? (M-06, J-09) (Pg.131)
19. What is gene therapy? Mention its types. (J-07, O-07, J-08, S-08, O-10, J-11) (BB) (Pg.132)
20. Differentiate somatic cell gene therapy from germ line gene therapy. (J-09) (Pg.132)
21. Define bioinformatics. (M-09) (Pg.133)
22. Write any three scopes of genetic engineering. (O-11) (Pg.133)
23. What are the scientific inventions that helped in paving way for origin of bioinformatics? (M-12)
24. Mention any three scopes of 'Bio-informatics'. (J-07) (Pg.134)
25. What is a database in bio-informatics? (M-08, O-10) (BB) (Pg.134)
26. What are the premier institutes considered as the authorities in the nucleotide sequence database? (O-11) (Pg.134)
27. What is DNA library? (O-06, M-07, M-11) (BB) (Pg.136)
28. What is cDNA? (M-10) (Pg.136)
29. Mention the language that helps in bio-informatics. (J-10) (Pg.137)
30. Write any three uses of bio-informatics. (S-08) (Pg.137)
31. What is Protein Data Bank? (J-06) (Pg.138)

- Describe the karyotyping of human chromosomes. (M-10) (Pg.121)
- Mention the uses of recombinant DNA technology. (M-07, M-08) (BB) (Pg.124)
- Give the symbolic representation of pedigree chart. (O-07) (Pg.126)
- Write a short note on Huntington's Chorea. (M-06) (Pg.127)
- What are the significance and benefits of Human Genome Project? (J-07, J-08, S-08, J-10, J-11) (Pg.128)
- Explain Dr. Ian Wilmut's cloning mechanism. (O-10) (Pg.129)
- What are the uses of transgenic animals? (M-12)
- Write a note on scope of Bio-informatics. (J-06, M-09) (Pg.134)
- What is database? Briefly explain its types. (O-09) (Pg.134)
- What are the ethical issues, merits and demerits of cloning? (O-06, M-11, O-11) (BB) (Pg.130)
- What is a 'Glowing coal'? What are the uses of it? (J-09) (Pg.138)

## **Chapter – V**

## **Environmental Science**

### **Section: B (3-Marks)**

- What is known as global warming? (O-07)(BB) (Pg.144)
- Mention any three causes of factors of global warming. (J-08, S-08) (Pg.144)
- What are ozone-depleting substances? (O-09) (Pg.144)
- What is greenhouse effect? (O-06) (Pg.144)
- What are the effects of ozone depletion? (J-09, J-11, O-11) (Pg.147)
- What is meant by ozone hole? (J-10) (Pg.147)
- What is non-biodegradable waste? Give an example. (J-06) (Pg.149)
- What are biomedical wastes? How are they disposed of? (M-06, J-07) (Pg.150)
- Define Biodiversity. (J-06) (BB) (Pg.152)
- Define 'Biosphere reserve'(O-10) (Pg.153)
- Write any two characteristics of a bioserve. (M-12)
- Mention two Biosphere reserves in Tamil Nadu. (M-06, M-08) (BB) (Pg.154)
- List out the names of any three bio-reserves in India. (M-09) (BB) (Pg.154)
- What are the advantages of solar energy? (M-07) (BB) (Pg.157)
- The future source of power is hydrogen. Why? (M-10) (Pg.158)
- What is meant by seeding of clouds? (O-06) (BB) (Pg.162)
- What is meant by bio-remediation? (M-11)

### **Section: D (10-Marks)**

- Give an account of greenhouse gases and their impacts on the environment. (or) 'Global warming is the direct result of Greenhouse effect'. Discuss the statement. What related problems do we foresee? (or) List out the effects of global warming & efforts to control global warming.(S-08,J-09, M-12) (BB) (Pg.144)
- "Ozone as a natural sun block" – Discuss and also list out the ways of preventing ozone depletion. (M-06, M- 07) (BB) (Pg.146)
- Write an essay on non-hazardous solid waste management. (M-10) (Pg.151)
- Write an essay on importance of bio diversity, consequences of losing Bio diversity and various strategies adopted to conserve biodiversity. (O-09) (Pg.152)
- How will you manage hazardous wastes? Discuss it with current knowledge. (J-07, M-08, J-11, O-11) (BB) (Pg.150)
- What is known as energy crisis? What are the steps taken to solve energy crisis? (O-06, J-08, S-08) (BB) (Pg.156)
- Give an account on poverty. (O-07, J-10) (BB) (Pg.159)
- Write about the fresh water resources and the reason for fresh water shortage. (O-10) (BB) (Pg.162)
- How are reuse and recycling techniques useful in management of solid wastes? Add a note on waste water treatment and management. (M-11) (Pg.151)
- Write an essay about Freshwater Management. (J-06, M-09) (Pg.162)

## **Chapter – VI**

## **Applied Biology**

### **Section: B (3-Marks)**

- Write any three characteristics of jersey breed. (M-11) (Pg.169)
- Write the name of any three exotic breeds of cattle. (M-12)
- How will you identify healthy cattle? (M-08) (BB) (Pg.169)
- List out the different types of diseases of cattle. (O-07) (BB) (Pg.169)
- What are the control and preventive measures of cow-pox diseases? (M-06, O-06) (BB) (Pg.170)
- Mention any two symptoms of Milk fever. (J-06, J-10)(Pg.170)
- What is milk fever? Mention its symptoms. (O-09) (Pg.170)
- What are the precautions and first aid for milk fever?(M-07)(Pg.170)
- What is meant by outbreeding? (O-11) (Pg.171)
- What is artificial insemination? (J-08, M-12) (BB) (Pg.171)
- What are the advantages of artificial insemination ?(O-06, J-07, J-09, M-08, S-08, J-11) (BB)(Pg.171)
- Mention any three breeds of indigenous fowls in India. (J-07)(Pg.173)
- What are the characteristic features of Aseel breed of fowl? (M-10) (Pg.172)
- Mention the important points to be considered during selection of eggs. (O-07, M-09)(Pg.174)
- How are the fish ponds categorized? (O-10) (Pg.179)

17. Mention the uses of stethoscope. (J-08)(Pg.183)
18. Mention the uses of sphygmomanometer. (M-09) (PageNo.-184)
19. What is Haemocytometer? (J-10) (Pg.185)
20. State the clinical significance of Haemocytometer. (O-10) (Pg.186)
21. What is known as Glycosuria?(S-08) (Pg.186)
22. What is Computed Tomography Scan? (J-06)(Pg.189)
23. Mention any three uses of C.T. (M-06, O-11) (Pg.189)
24. What is artificial pace maker? (O-09, M-10) (Pg.190)
25. Mention the advantages of autoanalyser. (M-07, M-11)(Pg.191)
26. Write the disadvantages of an autoanalyser. (J-09) (Pg.191)

**Section: D (10-Marks)**

1. Give account of origin, distribution, characters and milk production of dairy breeds. (O-06) (BB)(Pg.166)
2. Explain any two contagious diseases and two non-contagious diseases found in cattle. Mention about their prevention. (or) Write an essay on common diseases of cattle. (or) Give a detailed account on the contagious diseases of cattle. (J-07, M-08, J-08) (BB) (Pg.169)
3. How will you classify cattle based on their purpose? Give two examples for each. What are the various techniques adopted in cattle breeding? (M-06) (BB) (Pg.166 & 171)
4. What are the techniques adopted in cattle breeding? Write a short note on the exotic breeds of cattle. (M-10) (Pg. 171 & 169)
5. Explain the important-stages or steps in rearing of chickens. (or) Explain the stages involved in the rearing of poultry. (or) Describe poultry farming methods. (M-07, O-07, O-10)(Pg.174)
6. What are the categories of fish farming? Explain the characters of cultivable fish. (O-11) (Pg.177)
7. Write a detailed account on the preparation of fish pond and its maintenance. (M-09, J-11) (Pg.179)
8. Write the management of fish farm and explain any two edible fishes of Tamil Nadu. (J-06) (Pg.180)
9. Write about the instruments used to detect the heart beat and to measure the blood pressure.(J-10) (Pg. 183)
10. Describe the working method and uses of sphygmomanometer. (M-12) (Pg.183)
11. Briefly describe the P, Q, R, S, T waves of ECG.(O-09, M-11) (Pg.187)
12. What is CT scanner? Write the advantages and uses of CT scanner. (J09) (Pg.189)

**Chapter – VII**

**Theories of Evolution**

**Section: B (3 Marks)**

1. State the theory of inheritance of acquired characters.(J-07) (BB)( Pg.192)
2. Define first law of Lamarck. Write one example. (J-09) (Pg.192)
3. State Germplasm theory. (J-06, O-06, S-07)(BB)(Pg.194)
4. What is meant by survival of the fittest? (M-07, O-11)(BB)( Pg.196)
5. Define Pangenesis theory. (M-09, M-11) (Pg.197)
6. Write the reasons for the formation of polysomics. (M-12)
7. Define "Gene pool". (M-08, O-10) (BB)(Pg.198, 199)
8. State or Define Hardy-Weinberg Law. (M-06, S-08, M-10) (Pg.200)
9. Define bottleneck effect. (J-08)(Pg.201)
10. Define Polymorphism. (J-10) (Pg.201)
11. What is species? Mention its types. (J-11) (Pg.202)
12. Differentiate allopatric species from sympatric species. (O-09) (Pg.203)

**Section: C (5 Marks)**

1. Write a short note on Neo-Lamarckism. (O-06) (BB)(Pg.194)
2. What are the objections to Darwinism? (O-07) (BB)(Pg.197)
3. Describe the modern concept of natural selection. (J-09) (BB)(Pg.198)
4. Explain chromosomal aberration (O-11) (Pg.199)
5. Write a detailed account on population genetics. or What are the condition under which Hardy-Weinberg law operates? (M-08, M-11) (BB)(Pg.199)
6. Describe the 'genetic drift' concept. or Describe sewall-wright effect.(O-08, M-12) (Pg.200)
7. What are the three pf processes in natural selection? Explain. (J-06) (Pg.201)
8. Write down the mechanism that prevents inter-specific crosses? or Explain pre-mating isolation. (J-08, J-07, J-10, J-11) (Pg. 202)
9. Give an account of different types of species. (O-10) (Pg. 203)