

**BIOLOGY**  
**(314)**

Time : 3 Hours

Maximum Marks : 100

- Note : (i) This question paper consists of two Sections, viz., 'A' and 'B'.  
(ii) All questions from Section 'A' are to be attempted.  
(iii) Section 'B' has got more than one option. Candidates are required to attempt questions from one option only.

**SECTION – A**

1. Name the bacterium that fixes the atmospheric nitrogen in the soil. 1
2. What do we call such molecules which help in the active transport of substances across the plasma membrane ? Do they necessarily require energy for working ? 1
3. How does cytokinesis occur in a plant cell ? 1
4. A spermatogenic cell of the testis is undergoing cell division to produce sperms. Name this type of cell division. 1
5. Give one example of a plant whose thread-like spirally coiled modification of weak stem helps it to climb. What do you call such modifications ? 1
6. Name the hormone secreted by the anterior pituitary gland, which is essential for the normal body growth. 1
7. What technical name is given to the condition in which the testes fail to descend in the scrotum in humans ? What is its consequence ? 1
8. Name the two purine bases of a nucleotide. 1
9. A friend of yours has just kept a solitary fish in a large beaker filled with tap water. Briefly explain why you cannot call it an ecosystem. 2
10. With regard to the nature of body cavity they possess, name the respective categories of roundworms and earthworms. 2
11. According to Fluid Mosaic Model each phospholipids molecule of a lipid bilayer of plasma membrane has two ends – an outer 'head' and an inner 'tail'. Which one of these ends is hydrophobic and which one is hydrophilic ? 2
12. A dividing animal cell is in its early prophase. Would would be the shape of the chromosomes and the behaviour of the centrioles ? 2
13. What is meant by in-vitro fertilization ? Give one prospect of this technique. 2

14. Define the terms 'demography' and 'census'. Mention any two aspects studied under demography. 2
15. What is population density ? Mention any two consequences of higher population density. 2
16. How is recombinant DNA produced ? 2
17. Draw a labeled diagram of a rhizome of ginger. 2
18. Draw a diagram of typical human vertebra and label the following parts :  
 (a) Transverse process  
 (b) Body  
 (c) Spinous process  
 (d) Vertebral foramen 2
19. Give the special characteristics of the following in Arthropoda :  
 (a) Legs  
 (b) Body cavity  
 (c) Chemical nature of cuticle 2
20. What are the three principal features of cell theory ? 3
21. (a) Briefly describe the four regions of a young root as seen in a longitudinal section.  
 (b) Name the two outer layers of the region of meristematic cells. 3
22. Define the following and give their values in a normal human adult at rest :  
 (a) Tidal volume  
 (b) Vital capacity  
 (c) Residual volume 2+1=3
23. (a) What is an ovarian cycle ?  
 (b) Differentiate between corpus luteum and Corpus albicans. 3
24. Define the term 'environment'. Name its two components with one example of each. 1+2=3
25. Discuss any three ways how man has disturbed the natural ecosystems. 3
26. What is amniocentesis ? Briefly state the various steps involved in this technique. 3
27. A haemophilic man marries a carrier woman. Trace the percentage of their sons and daughters who will be (a) normal, (b) haemophilic and (c) carrier. 4
28. (a) What is menstruation ?  
 (b) What term is used for the first onset of menstrual flow ? Give approximate age at which it usually starts.  
 (c) What do you 4

29. Briefly discuss the roles of the following factors in the rate of transpiration in plants :
- (a) Light
  - (b) Humidity
  - (c) Temperature
  - (d) Air
- 5
30. (a) Name the structure popularly called 'pacemaker' in human heart.  
 (b) Describe briefly the path through which a heartbeat travels after originating at the pacemaker.
- 5

**SECTION-B**  
**OPTION-I**  
**(Tools and Techniques in Biology)**

31. Write the full form of FAA. 1
32. The pH value of a solution is 6.7. Is it acidic, alkaline or neutral ? 1
33. Briefly describe the method of dry preservation of skeleton of frog. 2
34. What is a herbarium? Name any two chemicals used for killing the plants so that abscission layer and decay are prevented. 2
35. How will you culture bread mould in the laboratory ? Name the black dot-like structures which develop on the fully formed bread mould. Name the stage which these black dots contain within them. 4

**OPTION-II**  
**(Economic Biology)**

31. Which two of the following are the varieties of wheat crop ?  
 Padma; Jawahar; Sonara; Sabarmati; Hina 1
32. Name the source plant of the drug 'reserpine'. Mention its any one medicinal use. 1
33. Certain crop plants have a kind of special bacteria in their roots. Name the category of such plants. How these bacteria are useful in agriculture ? 2
34. What is lac? Differentiate between 'stick lac' and 'seed lac'. 2
35. (a) Differentiate between 'food crops' and 'cash crops', citing one example of each.  
 (b) What are the two main cereal crops of India ? In which seasons they are grown? 2

2+2=4

OPTION-III  
**(Health Sciences)**

- 31.** Name the pathogen of typhoid. What is its mode of transmission? 1
- 32.** If equal amount of sugar, butter and ghee are consumed, which one of them will provide most energy and which one the least ? 1
- 33.** “Undoubtedly vitamins do not yield energy, yet they are essential for our body”. Justify this statement. 2
- 34.** (a) Name the pathogen of poliomyelitis. Give two symptoms of this disease.  
(b) What programme has been undertaken by our Government to curb this disease ? 2
- 35.** Name four drugs which have hallucinogenic effects. Mention their ill effects on our body. 4

OPTION-IV  
**(Emerging Areas in Biology)**

- 31.** Name any two organisms which show bioluminescence. 1
- 32.** Name the immediate source of energy in our body. 1
- 33.** What are isomers ? Name any two isomers of monosaccharides. 2
- 34.** Differentiate between Transcription and Translation. 2
- 35.** (a) Name the organs of our body where ‘T’ lymphocytes and ‘B’ lymphocytes are produced.  
(b) What are the three categories of ‘T’ lymphocytes? Give their functions. 4