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**Part III — BIOLOGY**

( English Version )

Time Allowed : 3 Hours ]

[ Maximum Marks : 150

N. B. : Candidates should answer **Part - I** ( Botany ) & **Part - II** ( Zoology ) in separate answer-books.

**PART - I ( BOTANY )**

( Marks : 75 )

**SECTION - A**

Note : i) Answer all the questions.

ii) Choose and write the correct answer.  $14 \times 1 = 14$ 

- The conjunctive tissue in the stele of Bean root is
  - Parenchymatous
  - Collenchymatous
  - Chlorenchymatous
  - Sclerenchymatous.
- The size of the genome in *Arabidopsis thaliana* is
  - 130 kb
  - 130 mb
  - 3300 mb
  - 300 mb.
- $2n - 1$  represents
  - Nullisomy
  - Trisomy
  - Tetrasomy
  - Monosomy.

[ Turn over

7041

2

4. The gene isolated from which of the following organisms is capable of inactivating the herbicide 'Basta' ?
- a) *Bacillus thuringiensis*                      b) *Streptomyces hygroscopicus*  
c) *Pseudomonas putida*                      d) *Agrobacterium*.
5. Example for aquatic fern is
- a) *Azotobacter*                                      b) *Azolla*  
c) *Pseudomonas striata*                      d) *Azospirillum*.
6. The plant that is used for treating bone fractures is
- a) *Aegle marmelos*                              b) *Mimosa pudica*  
c) *Solanum nigrum*                              d) *Cissus quadrangularis*.
7. In Bentham and Hooker's system of classification, the sub-class Monochlamydeae includes
- a) 8 series and 36 families                      b) 7 series and 34 families  
c) 7 series and 36 families                      d) 6 orders and 34 families.
8. According to Phylogenetic system, the highly advanced family among monocots is
- a) Asteraceae                                      b) Orchidaceae  
c) Zingiberaceae                              d) Musaceae.
9. The type of fruit in *Ravenala* is
- a) Berry    b) Capsule  
c) Regma    d) Drupe.
10. If xylem completely surrounds the phloem, the vascular bundle is called
- a) Collateral                                      b) Bicollateral  
c) Amphivasal                                      d) Amphicribral.
11. Virus free germplasms are produced through
- a) Apical meristem culture                      b) Endosperm culture  
c) Embryo culture                              d) Protoplasmic fusion.

12. The enzyme that catalyses the fixation of  $\text{CO}_2$  in  $\text{C}_4$  cycle is

- a) RUBP carboxylase                      b) PEP carboxylase  
c) Transaminase                          d) PGA kinase.

13. The net gain of energy in Glycolysis is

- a) 2 ATP and 2  $\text{NADH}_2$                   b) 4 ATP and 4  $\text{NADH}_2$   
c) 3 ATP and 2  $\text{NADH}_2$                   d) 9 ATP and 6  $\text{NADH}_2$ .

14. Which of the following hormones delays the ageing in plants ?

- a) Auxins                                      b) Gibberellins  
c) Cytokinins                                d) Ethylene.

### SECTION - B

Note : Answer any seven questions.

7 × 3 = 21

15. What are the aims of biosystematics ?

16. Mention the fibre yielding plants of Malvaceae.

17. Write any three differences between the vascular bundles of Dicot stem and Monocot stem.

18. Describe any two types of collenchyma.

19. Draw and label the Polytene chromosome.

20. What is PEG ? Write its role.

21. What is photolysis of water ?

22. What is bolting ?

23. Write the role of following enzymes in respiration :

- a) Aldolase  
b) Succinyl CoA synthetase.

24. What is bio-piracy ? Give one example.

| Turn over

7041

4

**SECTION - C**

Note : i) Answer any four questions including Question No. 25 which is compulsory.

ii) Draw diagrams wherever necessary.

4 × 5 = 20

25. Write any five salient features of ICBN.
26. Write short notes on sieve elements.
27. Describe the structure of tRNA.
28. Define SCP. Write its uses.
29. Write the significance of pentose phosphate pathway.
30. Bring out any five physiological effects of Ethylene.
31. Bring out the economic importance of Teak.

**SECTION - D**

Note : i) Answer any two questions.

ii) Draw diagrams wherever necessary.

2 × 10 = 20

32. Describe *Ricinus communis* in botanical terms. Draw its floral diagram and write the floral formula.
33. Describe the internal structure of a dicot leaf.
34. Define Tissue culture. Describe the basic techniques of tissue culture.
35. Write an account on Calvin's cycle ( explanation or flow-chart ).

**PART - II ( ZOOLOGY )**

( Marks : 75 )

**SECTION - A**

Note : i) Answer all questions.

ii) Choose and write the correct answer.

16 × 1 = 16

1. Hepatitis B virus ( HBV ) is an enveloped virus with a
  - a) double stranded DNA
  - b) double stranded RNA
  - c) single stranded DNA
  - d) single stranded RNA.
2. Kala-azar is caused by
  - a) *Entamoeba histolytica*
  - b) *Leishmania donovani*
  - c) *Trypanosoma gambiense*
  - d) *Leishmania tropica*.
3. The test which is used to confirm the HIV infection, is
  - a) Western Blot
  - b) ELISA
  - c) Diploid cell staining
  - d) Pure culture.
4. The part of the antibody molecule which makes contact with the antigen is called
  - a) Hapten
  - b) Constant region
  - c) Epitope
  - d) Paratope.
5. The order of cat fishes is
  - a) Siluriformes
  - b) Channiformes
  - c) Perciformes
  - d) Cypriniformes.
6. Which one of the following imaging techniques gives excellent job of showing soft tissues and blood vessels ?
  - a) ECG
  - b) Endoscopic image
  - c) X-ray image
  - d) Magnetic resonance image.

**A**

[ Turn over





7041

8

25. What is pedigree chart ?
26. Write any three characteristics of Jersey breed.
27. Write any three advantages of Auto-analyser.
28. State the theory of pangenesis.

### SECTION - C

*Note :* Answer any *three* questions including Question No. **31** which is compulsory.

3 × 5 = 15

29. Enumerate the steps involved in root canal treatment of tooth.
30. Write notes on sexually transmitted bacterial diseases in man.
31. Write short notes on genetic basis of organ transplants.
32. Mention the ethical problems of cloning.
33. What are the conditions under which Hardy-Weinberg law operates ?

### SECTION - D

*Note :* Answer *any two* questions.

2 × 10 = 20

34. Describe the structure of a skeletal muscle.
35. Write an essay about Eye defects and their corrective measures.
36. How are reuse and recycling techniques useful in management of solid wastes ?  
Add a note on waste water treatment and management.
37. Write an essay on Electrocardiogram ( ECG ).