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BIOLOGY

(Theory)

Full Marks : 70

Time : 3 hours

General Instructions :

- (i) Write all the answers in the Answer Script.
- (ii) Attempt all parts of a Group serially in one place.
- (iii) All questions are compulsory.
- (iv) The figures in the margin indicate full marks for the questions.
- (v) This question paper consists of 5 (five) Groups—A, B, C, D and E.

Group—A consists of 12 questions (multiple-choice type) of which 10 questions are to be answered. Each question (Q. Nos. **1–12**) carries 1 mark.

Group—B consists of 7 questions (very short-answer type—I) of which 5 questions are to be answered. Each question (Q. Nos. **13–19**) carries 1 mark and to be answered in one word/sentence.

Group—C consists of 5 questions (short-answer type—I). Each question (Q. Nos. **20–24**) carries 2 marks with alternatives to be answered in 20–30 words.

Group—D consists of 12 questions (short-answer type—II) of which 10 questions are to be answered. Each question (Q. Nos. **25–36**) carries 3 marks and to be answered in 30–40 words.

Group—E consists of 3 questions (long-answer type). Each question (Q. Nos. **37–39**) carries 5 marks with alternatives to be answered in 60–80 words.

(2)

GROUP—A

Choose and write the correct answer of the following (any *ten*) :

$1 \times 10 = 10$

- 1.** Which of the following is released from the ovary at the time of ovulation?

 - (a) Primary oocyte
 - (b) Oogonium
 - (c) Secondary oocyte
 - (d) Ovum

- 2.** The first phase of embryonic development is

 - (a) cleavage
 - (b) blastulation
 - (c) gastrulation
 - (d) placentation

- 3.** Amoebic dysentery is a disease caused by

 - (a) *Plasmodium vivax*
 - (b) *Entamoeba histolytica*
 - (c) *Ascaris lumbricoides*
 - (d) *Wuchereria bancrofti*

(3)

4. A process of transfer of genetic information is

- (a) transversion
- (b) transcription
- (c) translation
- (d) translocation

5. In angiosperms, triple fusion is required for the formation of

- (a) embryo
- (b) endosperm
- (c) fruit
- (d) seed

6. The hard outer layer of pollen grain is called

- (a) intine
- (b) germ pore
- (c) exine
- (d) tapetum

7. A transgenic plant which may help in solving the problem of night blindness is

- (a) BT cotton
- (b) golden rice
- (c) Flavr Savr tomato
- (d) starlink maize

(4)

8. Ecosystem has two components. They are

- (a) plants and animals
- (b) amphibians and reptiles
- (c) biotic and abiotic
- (d) weeds and trees

9. The organism which causes disease in plants and animals is called

- (a) vector
- (b) pathogen
- (c) insect
- (d) worm

10. The loss of individual due to the death in a population is called

- (a) natality
- (b) mortality
- (c) emigration
- (d) immigration

(5)

11. Fungal association with the roots of higher plants in mycorrhiza is

- (a) mutualism
- (b) commensalism
- (c) parasitism
- (d) predation

12. Galapagos islands were associated with

- (a) Jean Lamarck
- (b) Charles Darwin
- (c) Alfred Wallace
- (d) Hugo de Vries

GROUP—B

Answer the following questions in one word/sentence each
(any five) : $1 \times 5 = 5$

13. Define xenogamy.

14. Expand GIFT.

15. Define ecosystem.

16. What is a plasmid?

17. What are Okazaki fragments?

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18. What is dihybrid cross?

19. What is crossing over?

GROUP—C

20. Distinguish between self-pollination and cross-pollination. 2

21. How is sex determined in human beings? 2

Or

Explain the law of segregation with the help of an example.

22. Draw a well-labelled diagram of an antibody molecule. 2

Or

Draw a well-labelled diagram of human sperm.

23. Explain biopatent. 2

24. Differentiate between 'food chain' and 'food web'. 2

GROUP—D

Answer the following questions (any *ten*) :

25. Where are Leydig cells found? What are their functions? 1+2=3

26. Define alcohol addiction. Write the damaging effects of alcohol addiction. 1+2=3

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27. What is menstrual cycle? Name the hormones and their functions which regulate menstrual cycle. $1+2=3$

28. Explain gene therapy with an example. 3

29. Mention the significant characteristics of plants pollinated by water. 3

30. Briefly explain the role of microbes in sewage treatment. 3

31. Differentiate between incomplete dominance and co-dominance with examples. 3

32. What is BT cotton plant? Explain how this cotton plant is able to resist the infestation by bollworms. $1+2=3$

33. Define predation. How does prey-predator relationship maintain a balance in the ecosystem? $1+2=3$

34. What is immunity? Distinguish between active immunity and passive immunity. $1+2=3$

35. Who discovered the first antibiotic and from where it was extracted? Name the microbes from which cyclosporin-A is extracted. $1+1+1=3$

36. Explain briefly how comparative anatomy supports biological evolution. 3

(8)

GROUP—E

37. Explain chromosomal theory of inheritance. Who proposed this theory? 4+1=5

Or

What is oogenesis? Explain the major events involved in oogenesis. 1+4=5

38. A man with blood group 'A' married a woman with blood group 'B'. They have a son with AB blood group and a daughter with blood group 'O'. Work out the cross and write the phenotype and genotype of the siblings. 3+2=5

Or

Explain the mechanism of translation with the help of a diagram. 4+1=5

39. Explain the steps involved in decomposition process. 5

Or

What is biodiversity? Describe the strategies involved in biodiversity conservation. 1+4=5

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