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BIOLOGY

(New Course)

(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 sentence.

(2)

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.

GROUP—A

Choose and write the correct answer of the following (any *ten*) : $\qquad$ 1×10=10

1. In angiosperm triple fusion is required for the formation of

(a) embryo

(b) endosperm

(c) fruit

(d) seed

2. The hormone relaxin is secreted by

(a) ovary

(b) placenta

(c) scrotum

(d) uterus

(3)

3. The hard outer layer of pollen grains is called

(a) intine

(b) exine

(c) germ pore

(d) tapetum

4. Which of the following is a Mendelian disorder?

(a) Down syndrome

(b) Klinefelter syndrome

(c) Haemophilia

(d) Genital herpes

5. In incomplete dominance, the genotypic ratio is

(a) 3 : 1

(b) 9 : 3 : 3 : 1

(c) 9 : 7

(d) 1 : 2 : 1

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

(a) Bt soybean

(b) FlavrSavr tomato

(c) StarLink maize

(d) Golden rice

(4)

7. The organism which causes diseases in plants and animals is called

(a) vector

(b) pathogen

(c) insect

(d) worm

8. The function of restriction endonuclease is

(a) to join DNA fragments

(b) to cleave DNA at specific point

(c) to produce complementary strands

(d) unwinding of DNA double helix

9. The substance produced by a cell in viral infection that can protect other cells from further infection is

(a) serotonin

(b) colostrum

(c) interferon

(d) histamine

10. Emigration is the

(a) number of individuals that have come into the habitat

(b) number of births in a given period

(c) number of deaths in a given period

(d) number of individuals that have left the habitat

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

    (a) mutualism

    (b) commensalism

    (c) parasitism

    (d) predation

12. Which of the following is an *in situ* conservation of biodiversity?

    (a) National Park

    (b) Botanical Garden

    (c) Zoological Park

    (d) Cryopreservation

GROUP—B

Answer the following questions in *one* sentence each (any *five*) : 1×5=5

13. Define polyembryony.

14. Who proposed the chromosomal theory of inheritance?

15. What is a plasmid?

16. What is a retrovirus?

17. Expand IUCN.

[P.T.O.

(6)

18. Define biotechnology.

19. Name two primary lymphoid organs.

GROUP—C

20. Write four characteristic features of a flower pollinated by wind. ½×4=2

21. What is codominance? Give an example. 1+1=2

Or

Explain the law of dominance by a monohybrid cross. 2

22. What are antibiotics? From which microorganism the antibiotic Penicillin was extracted? 1+1=2

Or

Draw a labelled diagram of a human sperm. 2

23. Explain biopiracy with a suitable example. 1+1=2

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

GROUP—D

Answer the following questions (any *ten*) :

25. Describe the process of fertilization in angiospermic plants. Give suitable diagram. 2+1=3

26. How is sex determined in human beings? 3

27. A child has blood group *O*. If the father has blood group *A* and mother has blood group *B,* work out the genotypes of the parents and the possible genotypes of the other offsprings. 3

28. What are the goals of the Human Genome Project? 3

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

30. Mention the steps involved in recombinant DNA technology. 3

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

32. How is a cancerous cell different from a normal cell? 3

33. Write the ecological adaptations in xerophytes. 3

34. What is biogas? Explain the role of microbes in biogas production. 1+2=3

35. The immune system of a person is suppressed. In the ELISA test, he was found positive to a pathogen.

   (a) Name the disease the patient is suffering from.

   (b) What is the causative organism?

   (c) Which cells of the body are affected by the pathogen? 1+1+1=3

36. What is a biosphere reserve? What are the different zones of a biosphere reserve? 1+2=3

(8)

GROUP—E

37. Define linkage and crossing over. Give their significance. When does crossing over take place?   2+2+1=5

Or

Explain briefly the process of oogenesis in humans.   5

38. What is Mendel's law of segregation? Explain with the help of a suitable cross.   1+4=5

Or

Explain the mechanism of DNA replication with suitable diagram.   4+1=5

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

Or

What is population? Explain the different types of negative interactions in a population.   1+4=5

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