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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) 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*) :

1×10=10

1. Development of fruit without fertilization is called
 - (a) polyembryony
 - (b) parthenocarpy
 - (c) parthenogenesis
 - (d) apomixis
2. Formation of mRNA from DNA is called
 - (a) transcription
 - (b) translation
 - (c) replication
 - (d) duplication
3. The protein which is secreted by virus-infected cells to protect non-infected cells is called
 - (a) antigen
 - (b) antibody
 - (c) antibiotic
 - (d) interferon

(3)

4. Which microbe is involved in the production of curd from milk?
- (a) *Lactobacillus bulgaricus*
 - (b) *Lactobacillus acidophilus*
 - (c) *Lactobacillus thermophilus*
 - (d) *Streptococcus thermophilus*
5. *Archaeopteryx* is the missing link between
- (a) man and apes
 - (b) birds and mammals
 - (c) amphibians and reptiles
 - (d) reptiles and birds
6. In recombinant DNA technology, the enzyme used for cutting DNA is
- (a) DNA polymerase
 - (b) DNA ligase
 - (c) RNA polymerase
 - (d) restriction endonuclease
7. Tubectomy, a method of population control, is performed on
- (a) both males and females
 - (b) males only
 - (c) females only
 - (d) pregnant females only

(4)

8. Which of the following is an *in-situ* method of conservation of biodiversity?

- (a) Sacred Groves
- (b) Zoological Parks
- (c) Botanical Gardens
- (d) Wildlife Safari Parks

9. Trisomy of the 21st chromosome causes

- (a) Klinefelters syndrome
- (b) Turner's syndrome
- (c) Sickle cell anaemia
- (d) Down's syndrome

10. Pollination by snail is called

- (a) myrmecophily
- (b) entomophily
- (c) ormithophily
- (d) malacophily

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11. Bacteria and fungi are

- (a) producers
- (b) primary consumers
- (c) scavengers
- (d) decomposers

12. Unauthorised use of bioresources of one country by another country without proper consent is referred to as

- (a) biopiracy
- (b) biopatent
- (c) biowar
- (d) biocontrol

GROUP—B

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

13. What is emasculation?

14. Write the full form of IUDs.

15. Define polyploidy.

16. Define population.

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17. What do you understand by the term 'biotechnology'?

18. Name two primary lymphoid organs.

19. What is Red Data Book?

GROUP—C

20. Differentiate between Antigens and Antibodies. 2

21. Draw a labelled diagram of a female reproductive system of human beings. 2

Or

Draw a diagrammatic representation of various events during menstrual cycle.

22. Differentiate between leading and lagging strand of DNA. 2

Or

Define convergent evolution with an example.

23. Define transcription unit with the help of a simple diagram. 1+1=2

24. Define mutualism with an example. 1+1=2

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GROUP—D

Answer the following questions (any *ten*) : 3×10=30

- 25.** What is double fertilization? Write the importance of double fertilization. 1+2=3
- 26.** State and explain Mendel's Law of Independent Assortment with an example. 1+2=3
- 27.** Explain the role of microbes in energy production. 3
- 28.** Write a brief note on the application of genetic engineering in medicine. 3
- 29.** State Hardy-Weinberg Principle. Write two factors which affect this principle. 2+1=3
- 30.** Explain the development of nuclear and cellular type of endosperm. 1½+1½=3
- 31.** What is DNA fingerprinting? Write the applications of DNA fingerprinting. 1+2=3
- 32.** Describe briefly the process of energy flow in an ecosystem. 3
- 33.** Work out a cross showing marriage between a haemophilic man and a carrier woman. Write the phenotype of their children. 2+1=3
- 34.** What is primary productivity? Differentiate between primary and secondary productivity. 1+2=3

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- 35.** Define linkage. Write the differences between complete linkage and incomplete linkage. 1+2=3
- 36.** How are gene of interest amplified in genetic engineering? 3

GROUP—E

- 37.** Define fertilization. Where does this process take place in a female body? Describe the process of fertilization in humans. 1+1+3=5

Or

What is an operon? Explain the regulation of gene expression in lac operon with suitable diagrams. 1+3+1=5

- 38.** What are ecological pyramids? Draw and explain the ecological pyramids of number and energy. 1+1+3=5

Or

What is DNA replication? Explain the process of DNA replication with suitable diagrams. 1+3+1=5

- 39.** Define Human Genome Project (HGP). Write the salient features of the Human Genome Project. Write two applications of HGP. 1+3+1=5

Or

What is cancer? Name the different types of cancer. Differentiate between Benign tumour and Malignant tumour. 1+2+2=5

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