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HS/XII/Sc/Bio/22

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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 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) : 1×10=10

1. Embryo sac of an angiosperm is homologous to
 - (a) megaspore
 - (b) female gametophyte
 - (c) sporangium
 - (d) microspore

2. A clone is a group of individuals obtained through
 - (a) sexual reproduction
 - (b) hybridization
 - (c) asexual reproduction
 - (d) cross-pollination

(3)

3. Which of the following nitrogenous bases is not present in DNA?
- (a) Thymine
 - (b) Adenine
 - (c) Guanine
 - (d) Uracil
4. Which of the following gases is responsible for the puffed-up appearance of the dough?
- (a) NH_3
 - (b) CO_2
 - (c) O_2
 - (d) CH_4
5. Which hormone is involved in lactation?
- (a) Prolactin
 - (b) Testosterone
 - (c) Thyroxine
 - (d) Vasopressin
6. In recombinant DNA technology, the term 'vector' refers to
- (a) the enzyme that cuts DNA into restriction fragments
 - (b) the sticky end of a DNA fragment
 - (c) a plasmid used to transfer DNA into a living cell
 - (d) a DNA fragment which carries only *ori* gene

(4)

7. Influx of an individual into the population is
- (a) emigration
 - (b) immigration
 - (c) natality
 - (d) mortality
8. Hot spots are the examples of
- (a) *in-situ* conservation
 - (b) *ex-situ* conservation
 - (c) wildlife protection
 - (d) water conservation
9. Common cold—the most infectious human ailment is caused by
- (a) Rhinoviruses
 - (b) *Streptococcus pneumoniae*
 - (c) *Salmonella typhi*
 - (d) *Plasmodium vivax*
10. Klinefelter's syndrome is characterized by a karyotype of
- (a) XYY
 - (b) XO
 - (c) XXX
 - (d) XXY

(5)

- 11.** Which layer of microsporangium provides nutrition to the developing pollen grains?
- (a) Epidermis
 - (b) Endothecium
 - (c) Tapetum
 - (d) Endodermis
- 12.** The wings of a bird and that of an insect are
- (a) Analogous structures
 - (b) Homologous structures
 - (c) Vestigial structures
 - (d) Useless structures

GROUP—B

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

- 13.** Define geitonogamy.
- 14.** Define mutation.
- 15.** What is totipotency?
- 16.** What is the full form of PCR?
- 17.** What is apiculture?

(6)

18. Name the two major groups of cells required to attain immunity.
19. What does the term 'standing state' of soil signify?

GROUP—C

20. Write four characteristic features of entomophilous flower. $\frac{1}{2} \times 4 = 2$
21. At what stage of menstrual cycle corpus luteum is formed in human female? Name the hormone produced by corpus luteum. $1 + 1 = 2$

Or

Draw a well labelled diagram of a seminiferous tubule (transverse section). 2

22. State the Hardy-Weinberg principle. 2

Or

Write down the four major characteristics of genetic code. $\frac{1}{2} \times 4 = 2$

23. Define biomagnification. Give an example. $1 + 1 = 2$

24. What are biofertilizers? Give examples. $1 + 1 = 2$

GROUP—D

Answer the following questions (any ten) :

25. Explain the process of double fertilization with the help of a suitable diagram. $2 + 1 = 3$

(7)

- 26.** What is incomplete dominance? Work out a cross between red flower and white flower of *Mirabilis jalapa* to show incomplete dominance. Give the phenotypic and genotypic ratios. 1+1+1=3
- 27.** What is DNA fingerprinting? Give the full form of VNTR. List two applications of DNA fingerprinting. 1+1+1=3
- 28.** Define plant breeding. What are the major objectives of plant breeding? 1+2=3
- 29.** What are ecological pyramids? Describe the pyramid of energy with a diagram. 1+2=3
- 30.** Define vaccine. Describe the principle of vaccination with an example. 1+1+1=3
- 31.** Write briefly the applications of biotechnology in agriculture. 3
- 32.** (a) During translation, tRNA brings which amino acid for the initiation codon AUG?
(b) In which cell organelles translation occurs?
(c) Name the type of bond formed between the amino acids in a protein chain. 1+1+1=3
- 33.** What is insulin? How is human insulin genetically engineered? 1+2=3
- 34.** What is tumour? Differentiate between benign and malignant tumours. 1+2=3

(8)

- 35.** What do you understand by ozone layer depletion? Describe how depletion of ozone layer occurs in stratosphere. 1+2=3
- 36.** What is natural method of contraception? Briefly describe any one method. 1+2=3

GROUP—E

- 37.** State Mendel's law of independent assortment. Describe the law with an appropriate dihybrid cross. 1+4=5

Or

Define fertilization. Where does it occur in human female? Describe the process briefly. 1+1+3=5

- 38.** Give an account of transcription process in bacteria with suitable diagrams. 4+1=5

Or

Describe the tools used in recombinant DNA technology. 5

- 39.** Explain the flow of energy in an ecosystem with the help of suitable diagrams. 4+1=5

Or

Define ecological succession. Explain the process of xerarch succession. 1+4=5
