

CBSE QUESTION PAPER

BIOLOGY (Theory)

Time allowed : 3 hours

Maximum Marks : 70

General Instructions:

- (i) *All questions are compulsory.*
- (ii) *The question paper consists of four sections A, B, C and D. Section A contains 8 questions of one mark each, Section B is of 10 questions of two marks each, Section C is of 9 questions of three marks each and Section D is of 3 questions of five marks each.*
- (iii) *There is no overall choice. However, an internal choice has been provided in one question of 2 marks, one question of 3 marks and all the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.*
- (iv) *Wherever necessary, the diagrams drawn should be neat and properly labelled.*

SECTION A

1. A bilobed, dithecous anther has 100 microspore mother cells per microsporangium. How many male gametophytes this anther can produce? [1 mark]
2. Mention two functions of the codon AUG. [1 mark]
3. Name the scientist who disproved spontaneous generation theory. [1 mark]
4. What is it that prevents a child to suffer from a disease he/she is vaccinated against? Give one reason. [1 mark]
5. Why is the enzyme cellulase used for isolating genetic material from plant cells but not for animal cells? [1 mark]
6. Name a molecular diagnostic technique to detect the presence of a pathogen in its early stage of infection. [1 mark]
7. If 8 individuals in a laboratory population of 80 fruitflies died in a week, then what would be the death rate for population for the said period? [1 mark]

8. Mention one positive and one negative application of amniocentesis. [1 mark]

SECTION - B

9. A moss plant produces a large number of antherozoids but relatively only a few egg cells. Why? 2
10. Mention the reasons for difference in ploidy of zygote and primary endosperm nucleus in an angiosperm. 2
11. How does an electrostatic precipitator work to remove particulate pollutants released from the thermal power plants? 2
12. Name the type of food chains responsible for the flow of larger fraction of energy in an aquatic and a terrestrial ecosystem respectively. Mention one difference between the two food chains. 2
13. How does a test-cross help in identifying the genotype of the organism? Explain. 2
14. Name the host and the site where the following occur in the life-cycle of a malarial parasite :
- (a) Formation of gametocytes
- (b) Fusion of gametocytes 2
15. Honey collection improves when beehives are kept in crop-fields during flowering season. Explain. 2

OR

How does addition of a small amount of curd to fresh milk help formation of curd? Mention a nutritional quality that gets added to the curd.

16. Why is the introduction of genetically engineered lymphocytes into a ADA deficiency patient not a permanent cure? Suggest a possible permanent cure. 2
17. How does the floral pattern of Mediterranean orchid *Ophrys* guarantee cross pollination? 2

18. In the biosphere immense biological diversity exists at all levels of biological organisation. Explain any two levels of biodiversity. 2

SECTION - C

19. Draw a longitudinal section of a post - pollinated pistil showing entry of pollen tube into a mature embryo-sac. Label filiform apparatus, chalazal end, Hilum, antipodals, male gametes and secondary nucleus. 3

OR

Draw a labelled sectional view of seminiferous tubule of a human male.

20. During his studies on genes in *Drosophila* that were sex-linked T.H. Morgan found F₂ - population phenotypic ratios deviated from expected 9 : 3 : 3 : 1. Explain the conclusion he arrived at. 3
21. Describe the initiation process of transcription in bacteria. 3
22. Explain convergent and divergent evolution with the help of one example of each. 3
23. Name the type of human cell HIV attacks on its entry into the body. Explain the events that occur in the cell which further lead to cause immunodeficiency syndrome. 3
24. Explain the efforts which must be put in to improve health, hygiene and milk yield of cattle in a dairy farm. 3
25. Identify a, b, c, d, e and f in the table given below: 3

	Organism	Bioactive molecule	Use
1.	<i>Monascus perpureus</i> (yeast)	a	b
2.	c	d	antibiotic
3.	e	Cyclosporin A	f

26. Eco RI is used to cut a segment of foreign DNA and that of a vector DNA to form a recombinant DNA. Show with the help of schematic diagrams. 3

- (i) The set of palindromic nucleotide sequence of base pairs the Eco RI will recognise in both the DNA segments. Mark the site at which Eco RI will act and cut both the segments.
 - (ii) Sticky ends formed on both the segments where the two DNA segments will join later to form a recombinant DNA.
27. How does RNA interference help in developing resistance in tobacco plant against nematode infection? 3

SECTION - D

28. (a) How does a chromosomal disorder differ from a Mendelian disorder?
- (b) Name any two chromosomal aberration associated disorders.
- (c) List the characteristics of the disorders mentioned above that help in their diagnosis. 5

OR

Fitness is the end result of the ability to adapt and get selected by Nature. Explain with suitable example.

29. When and where are primary oocytes formed in a human female? Trace the development of these oocytes till ovulation (in menstrual cycle). How do gonadotropins influence this developmental process? 5

OR

- (a) Explain the events taking place at the time of fertilization of an ovum in a human female.
- (b) Trace the development of the zygote upto its implantation in the uterus.
- (c) Name and draw a labelled sectional view of the embryonic stage that gets implanted.

30. Draw and explain a logistic curve for a population of density (N) at time (t) whose intrinsic rate of natural increase is (r) and carrying capacity is (k).

5

OR

Describe the process of decomposition of detritus under the following heads:
Fragmentation; leaching; catabolism; humification and mineralization.