

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 3 Hours

Maximum Marks: 70

General Instructions

- (i) This question paper contains **27 questions**. All questions are compulsory.
- (ii) Section A: Questions 1 to 5 carry 1 mark each.
- (iii) Section B: Questions 6 to 12 carry 2 marks each.
- (iv) Section C: Questions 13 to 24 carry 3 marks each.
- (v) Section D: Questions 25 to 27 carry 5 marks each.
- (vi) Attempt one alternative where an internal choice is provided. Follow the instructions within each question.
- (vii) Draw neat, properly labelled diagrams wherever necessary.

Section A

1. At what stage does the meiosis occur in an organism exhibiting haploidic life cycle and mention the fate of the products thus produced.

2. Write the number of chromosomes body cells of honey bee workers and drone have.

3. What are 'flocs', formed during secondary treatment of sewage ?

OR

3. Write any two places where methanogens can be found.

4. Name the layer of the atmosphere that is associated with 'good ozone'.

OR

4. Mention the term used to describe a population interaction between an orchid growing on a forest tree.

5. British geneticist R.C. Punnett developed a graphical representation of a genetic cross called "Punnett Square". Mention the possible result this representation predicts of the genetic cross carried.

Section B

6. It is said apomixis is a type of asexual reproduction. Justify.

7. Mention **four** significant services that a healthy forest ecosystem provide.

OR

7. Substantiate with the help of one example that in an ecosystem mutualists (i) tend to co-evolve and (ii) are also one of the major causes of biodiversity loss.

8. Write the steps in sequence as carried in multiple ovulation embryo transfer technology.

9. What is an origin of replication in a chromosome ? State its function.

10. List any **four** ways by which GMO's have been useful for enhanced crop output.

11. How is a continuous culture system maintained in bioreactors and why ?

12. How would the gene flow or genetic drift affect the population in which either of them happen to take place ?

Section C

13. How does a bisexual flowering plant ensures cross pollination ? Explain.

14. Bee keeping practice is a good income generating industry. Write the different points to be kept in mind for successful bee keeping. Write the scientific name of the most common Indian species used for the purpose.

15. Explain the mechanism of DNA replication with the help of a replication fork. What role does the enzyme DNA-ligase play in a DNA replication fork ?

OR

15. Construct and label a transcription unit from which the RNA segment given below has been transcribed. Write the complete name of the enzyme that transcribed this RNA.

5'-A T G C A T G C A T G C-3'
"RNA molecule"

16. (a) Write **two** differences between *Homo erectus* and *Homo habilis*.

(b) Rearrange the following from early to late geologic periods : Carboniferous, Silurian, Jurassic.

17. List **six** advantages of "ex-situ" approach to conservation of biodiversity.

18. Effluent from the primary treatment of sewage is passed for secondary treatment. Explain the process till the water is ready to be released into natural water bodies.

19. Two children, A and B aged 4 and 5 years respectively visited a hospital with a similar genetic disorder. The girl A was provided enzyme-replacement therapy and was advised to revisit periodically for further treatment. The girl, B was, however, given a therapy that did not require revisit for further treatment.

(a) Name the ailments the two girls were suffering from ?

(b) Why did the treatment provided to girl A required repeated visits ?

(c) How was the girl B cured permanently ?

20. Draw a labelled diagram to show interrelationship of four accessory ducts in a human male reproductive system.

OR

20. Draw a sectional view of the human ovary showing the different stages of developing follicles, corpus luteum and ovulation.

21. Compare in any three ways the chromosomal theory of inheritance as proposed by Sutton and Boveri with that of experimental results on pea plant presented by Mendel.

OR

21. (a) Explain linkage and recombination as put forth by T.H. Morgan based on his observations with *Drosophila melanogaster* crossing experiment.

(b) Write the basis on which Alfred Sturtevant explained gene mapping.

22. Describe the formation of recombinant DNA by the action of EcoRI.

OR

22. Describe the process of amplification of “gene of interest” using PCR technique.

Column – A	Column – B
(H) <i>Penicillium notatum</i>	(i) Statin
(I) <i>Trichoderma polysporum</i>	(ii) ethanol
(J) <i>Monascus purpurea</i>	(iii) antibiotic
(K) <i>Saccharomyces cerevisiae</i>	(iv) Cyclosporin-A

23. (a) Match the microbes listed under Column-A with the products mentioned under Column-B.

(b) Why does ‘Swiss Cheese’ develop large holes ?

24. Explain any two most important levels of biological organisation showing biodiversity with the help of an example each.

Section D

25. (a) Differentiate between spermatogenesis and Oogenesis on the basis of :

- (i) Time of initiation of the process
- (ii) Site of completion of the process
- (iii) Nature of meiotic division undergone by gamete mother cells

(b) Name the hormones and state their role involved in controlling spermatogenesis in humans.

OR

25. (a) Explain the process of double fertilization in angiosperms.

(b) Why does the development of endosperm precedes that of embryo ?

(c) List the parts of a typical dicot embryo.

26. (a) What is “population” according to you as a biology student ?

(b) “The size of a population for any species is not a static parameter.” Justify the statement with specific reference to fluctuations in the population density of a region in a given period of time.

OR

26. (a) What is hydrarch succession ?

(b) Compare the pioneer species and climax communities of hydrarch and xerarch succession respectively.

(c) List the factors upon which the type of invading pioneer species depend in secondary hydrarch succession. Why is the rate of this succession faster than that of primary succession ?

27. Differentiate between incomplete dominance and co-dominance. Substantiate your answer with one example of each.

OR

27. (a) Write the contributions of the following scientists in deciphering the genetic code : George Gamow ; Hargobind Khorana ; Marshall Nirenberg ; Severo Ochoa

(b) State the importance of a Genetic code in protein biosynthesis.

- End of Question Paper -