

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



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 1 mark each; Section B contains 10 questions of 2 marks each; Section C contains 9 questions of 3 marks each; and Section D contains 3 questions of 5 marks each.
- (iii) There is no overall choice. An internal choice is provided in one question of 2 marks, one question of 3 marks and all three questions of 5 marks. Attempt only one alternative in such questions.
- (iv) Draw neat and properly labelled diagrams wherever necessary.

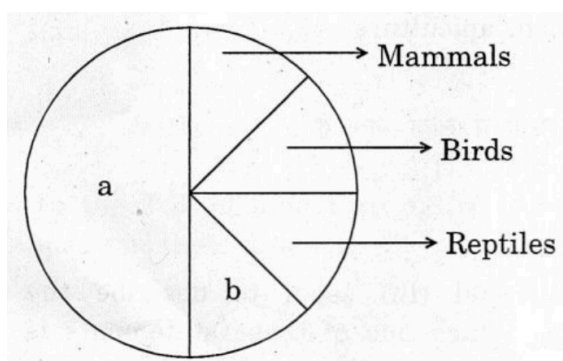
Section A

1. At which ends do 'capping' and 'tailing' of hnRNA occur respectively?

2. The meiocyte of rice has 24 chromosomes. How many chromosomes are present in its endosperm?

3. BOD of two samples of water A and B were 120 mg/L and 400 mg/L respectively. Which sample is more polluted?

4. Name the unlabelled areas 'a' and 'b' of the pie chart representing biodiversity of vertebrates showing the proportionate number of species of major taxa.



5. Are the wing of a bird and the forelimb of a horse homologous or analogous? Name the type of evolution that explains the development of such structures.

6. Name the type of interaction seen between whale and the barnacles growing on its back.

7. Which one of the following is used in apiculture :

Hilsa, Apis indica, Sonalika

8. The following statements (i), (ii) and (iii) seem to describe the water-pollinated submerged plants. Which one of these statements is *incorrect*?

(i) The flowers do not produce nectar.

(ii) The pollen grains have mucilaginous covering.

(iii) The brightly coloured female flowers have long stalk to reach the surface.

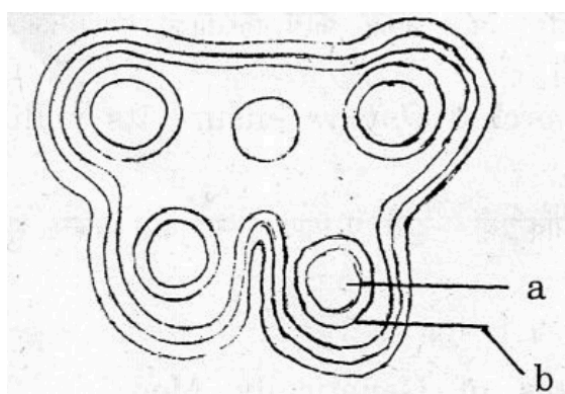
Section B

9. Name the source organism from which Ti plasmid is isolated. Explain the use of this plasmid in biotechnology.

10. (a) Explain the property that prevents normal cells from becoming cancerous.

(b) All normal cells have inherent characteristic of becoming cancerous. Explain.

11. In the T.S. of a mature anther given below identify "a" and "b" and mention their function.



12. Name the category of codons UGA belongs to. Mention another codon of the same category. Explain their role in protein synthesis.

13. How do automobiles fitted with catalytic converters reduce air pollution? Suggest the best fuel for such vehicles.

14. List the specific symptoms of pneumonia. Name the causative organism.

OR

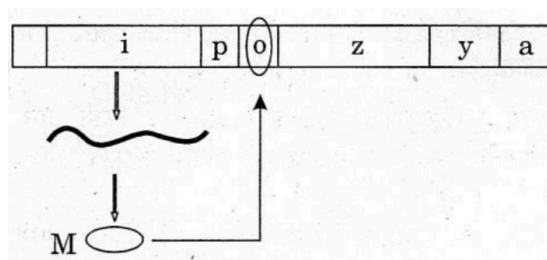
14. How does spleen act as a lymphoid organ? Explain.

15. How does the Mediterranean orchid *Ophrys* ensure its pollination by bees?

16. Highlight any four advantages of Genetically Modified Organisms (GMOs).

17. What is Colostrum? Why is it important to be given to the newborn infants?

18.



(a) Name the molecule 'M' that binds with the operator.

(b) Mention the consequences of such binding.

(c) What will prevent the binding of the molecule 'M' with the operator gene? Mention the event that follows.

19.



- Identify the figure.
- Name the initial cell from which this structure has developed.
- Draw the next mature stage and label the parts.

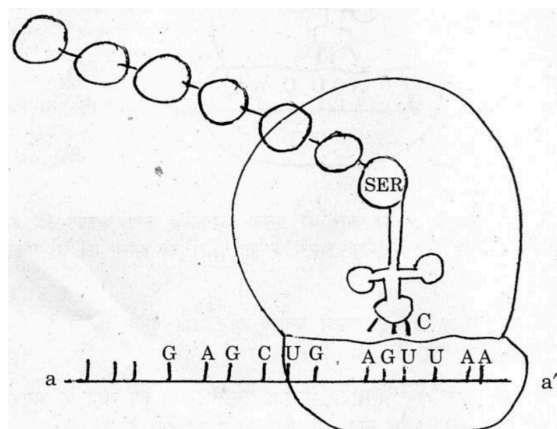
20. A particular species of wild cat is endangered. In order to save them from extinction, which is a desirable approach *in situ* or *ex situ*? Justify your answer and explain the difference between the two approaches.

21. (a) What is EcoRI? What does 'R' represent in this?

(b) Give the palindromic nucleotide sequence recognised by it.

(c) Explain its action.

22.



(a) Identify the polarity from a to a' in the above diagram and mention how many more amino acids are expected to be added to this polypeptide chain.

(b) Mention the DNA sequence coding for serine and the anticodon of tRNA for the same amino acid.

(c) Why are some untranslated sequence of bases seen in mRNA coding for a polypeptide? Where exactly are they present on mRNA?

23. Why is predation required in a community of different organisms?

24. (a) Name the virus that causes AIDS in humans.

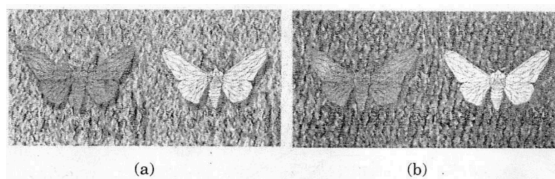
(b) Explain the sequence of events that follows when this virus attacks to cause immune deficiency in humans.

25. In one family each of the four children has a different blood group. Their mother is group A and the father is group B. Explain this pattern of inheritance with the help of a cross along with the genotypes.

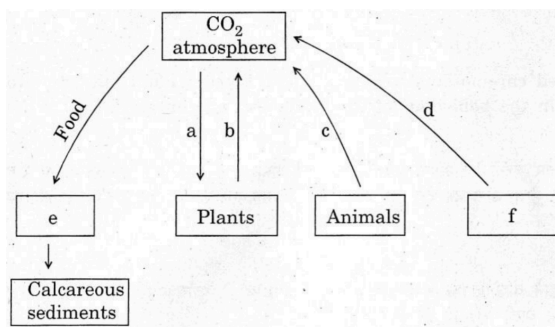
OR

25. Who proposed chromosomal theory of inheritance? Point out any two similarities in the behaviour of chromosomes and genes.

26. What do these pictures 'a' and 'b' illustrate with reference to evolution? Explain.



27. Draw and complete the following model of carbon cycle filling a, b, c, d, e and f.



Section D

28. (a) Explain the observations of Meselson and Stahl when

(i) they cultured *E. coli* in a medium containing $^{15}\text{NH}_4\text{Cl}$ for a few generations and centrifuged the content.

(ii) they transferred one such bacterium to the normal medium of NH_4Cl .

(b) What does the above experiment prove?

(c) Which is the first genetic material identified?

OR

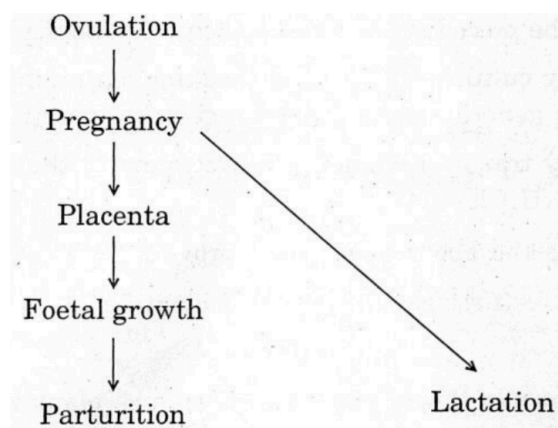
28. Inheritance pattern of flower colour in garden pea plant and snap dragon differs. Why is the difference observed? Explain showing the crosses.

29. (a) Draw a labelled diagram of a mature embryo sac of an angiosperm.

(b) Why does a pollen grain possess two male gametes? Explain.

OR

29. Study the flow chart given below. Name the hormones involved at each stage and explain their role.



30. (a) Why are engineered vectors preferred by biotechnologists for transferring the desired genes into another organism?

(b) Explain how do "ori", "selectable markers" and "cloning sites" facilitate cloning into a vector.

OR

30. (a) How is a transgenic tobacco plant protected against *Meloidogyne incognita*?

(b) Explain the procedure of making such plants.

- End of Question Paper -