

BIOLOGY (Theory)

Time allowed: 3 Hours

Maximum Marks: 70

General Instructions:

(i) All questions are compulsory.

(ii) This 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 each 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 labeled.

Section-A

1. What acts as the "molecules scissors" in biotechnology?
2. Name the improved variety of Brassica (rape seed mustard) that is resistant to aphids.
3. How does the spleen serve as an organ of immunity?
4. Represent schematically the central dogma in molecular biology as proposed by Francis Crick.
5. How did the first transgenic cow Rosie differ from other cows with respect to the quality of milk?
6. Are the wings of butterfly and bat homologous organs or analogous organs? Justify your answer.
7. Which one of the following is a conformer with respect to homeostasis and how?
Tiger, Dog, Shark, Whale
8. An exotic prickly pear cactus when brought into Australia in 1920s, became a menace later. Mention how was this invasive cactus brought under control.

Section-B

9. What is the advantage of inbreeding in cattle? How does continued inbreeding affect the cattle population?

OR

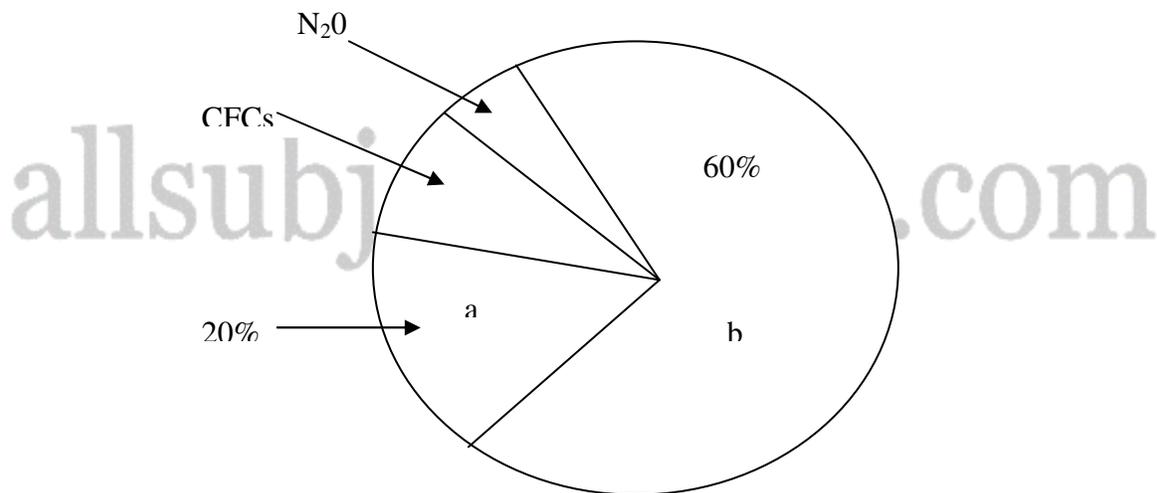
What is contact inhibition in the normal cells of the body? What are the consequences when this property is lost by these cells?

10. (a) Write the specific palindromic nucleotide sequence in DNA that is recognized by EcoRI.
(b) What does EcoRI stand for?
11. List the types of RNA polymerases found in the cell. How are they different from each other?
12. How do the tribes who live in very high altitudes of Himalayas adapt themselves to low O₂ availability?

13. Under what circumstances does the secondary succession begin? Why does it proceed faster than primary succession?
14. Why is DNA considered a better and predominant genetic material than RNA?
15. List and explain the two steps followed by a researcher in artificial hybridization to produce improved variety of tomatoes.
16. Name the types of immunity provided by vaccines and colostrums in humans. Mention one difference between them.
17. Name the region on the earth called the "lungs of the planet". Mention, giving reasons, the activities which are being carried out in this region now.
18. Banana is a true fruit and also a parthenocarpic fruit. Justify.

Section-C

19. What functions do detritivores play in an ecosystem? Explain the significance of humification and mineralization in a decomposition cycle.



20. The pie chart given shows the components of the greenhouse gases.
 (i) Identify 'a' and 'b'.
 (ii) Expand CFC. How do they cause ozone hole?
 (iii) Why is the ozone hole a threat to mankind?

OR

- (i) In which ecosystem is the pyramid of biomass inverted?
 (ii) Why is it inverted? Explain.
 (iii) Name the type of pyramid that is always upright. Give reasons.
21. A man with AB blood married a woman with O blood group. Work out the cross to show the possible blood group of their progeny. How many alleles are involved in the inheritance of these blood groups in humans?
22. (a) Name the mode of reproduction by which Plasmodium multiplies in the human body and where does it do so.
 (b) Shivering and high fever are the common symptoms of malaria in humans. Explain the cause of these symptoms.

(b) Trace the vents that occur in a functional megaspore leading to the development of a matured embryo sac in an angiosperm.

OR

(a) Draw a labeled diagram of the fine microscopic structure of a human sperm.

(b) Trace the development of spermatozoa from the primary spermatocytes in human testes.

30. What is gene amplification? Explain the steps involved in gene amplification by polymerase chain reaction.

OR

What is genetic engineering? Explain in correct sequence the steps involved in recombinant DNA technology to produce a genetically modified cell.

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