

Question Paper

Conducted by the Central Board of Secondary Education (CBSE)



Time Allowed: 2 Hours

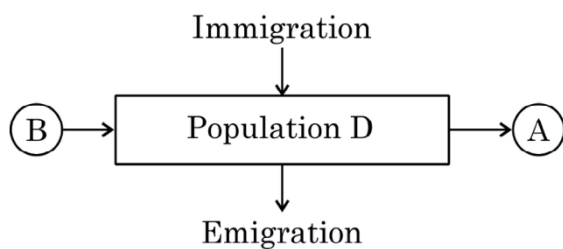
Maximum Marks: 35

General Instructions

- (i) This question paper contains **13 questions**. All questions are compulsory.
- (ii) Section A: Questions 1 to 6 carry 2 marks each.
- (iii) Section B: Questions 7 to 12 carry 3 marks each.
- (iv) Section C: Questions 13 carry 5 marks each.
- (v) Attempt one alternative where an internal choice is provided. Follow the instructions within each question.
- (vi) Draw neat, properly labelled diagrams wherever necessary.

Section A

1(a).



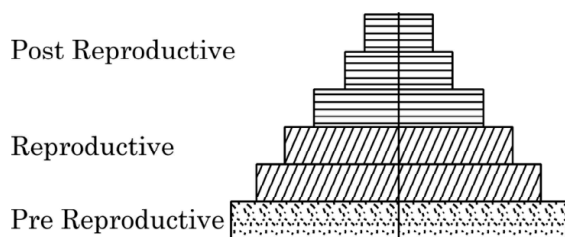
Observe the schematic representation given above and answer the following questions:

(i) Identify A and B.

(ii) Calculate the growth rate of bacteria in a curd sample, where 1 million bacteria increased to two million, within a period of one hour.

OR

1(b).



Identify the type of pyramid given above. Write the identifying feature on the basis of which you identified it.

2. A boy developed some allergic reactions when he straight entered into his air conditioned room after a game of football outside his house. Write any two symptoms that could be noticed in such condition. How does our body combat such conditions?

3(a). (i) Write the Scientific name of the plant from where natural cannabinoids are obtained.

(ii) Mention the parts of the plant that are used for extracting the drug.

(iii) How does the drug affect human body?

OR

3(b). Epithelial lining of our intestine is considered as secondary lymphoid organ. Justify the statement.

4. What are flocs? State their role in biological treatment of sewage.

5. How are 'in-situ' and 'ex-situ' approaches of biodiversity conservations different from each other?

6. Farmers are often suggested to use the following organisms in their crop land so as to improve the soil fertility.

(i) Rhizobium (ii) Anabaena

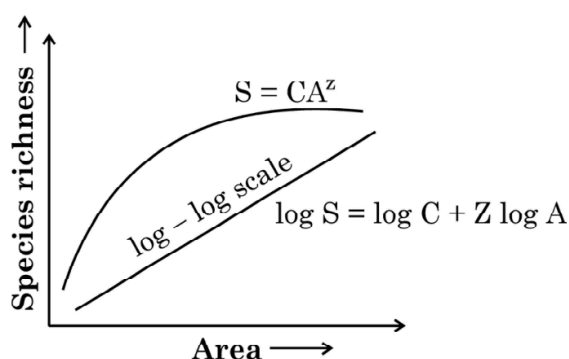
Explain.

Section B

7. Restriction endonucleases are used in genetic engineering to form recombinant DNA. Explain only with the help of a flow chart the steps carried in the formation of a recombinant DNA.

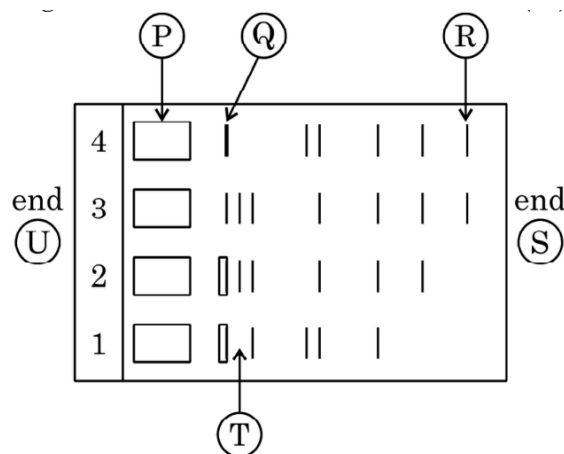
8. (a) Write the inference drawn by Alexander von Humboldt after his extensive explorations of South American jungle.

(b) Study the graph given below:



As per Alexander von Humboldt, what do the symbols S, A, Z and C in the graph stand for, in respect of a species and area relationship?

9. (a) Given below is the stepwise schematic representation of the process of electrophoresis. Identify the 'alphabets' representing (i) Anode end (ii) smallest/lightest DNA strand in the matrix (iii) Agarose gel



(b) What is elution? State the importance of elution in this process.

10. (a) Explain the property of contact inhibition and its effect on normal human cells and cancerous cells.

(b) Why are biological modifiers like α -interferon required for cancer treatment? How do they act to treat the disease?

11. What are cry-proteins? With the help of a suitable example, explain how it acts as a biological pesticide.

12(a). Explain the concept of "co-extinction" by taking two examples.

OR

12(b). "Forests provide intangible benefits to us." Explain by taking three different areas, how.

Section C

13(a). Read the paragraph given below and answer the questions that follow:

Enzyme Taq polymerase, is extracted from a eubacterial microorganism *Thermus aquaticus* from Yellowstone National Park in Montana, USA and isolated by Chien et al. (1976). Taq polymerase successfully replaced the DNA polymerase from *E.coli* that was being used in PCR earlier and this shift revolutionised the PCR technique.

- (i) Taq polymerase after its discovery replaced *E.coli* DNA polymerase in PCR technique. Explain giving reasons why was the need felt for the change?
 - (ii) What is a primer and its importance in PCR?
 - (iii) Write the importance of PCR as a diagnostic tool.
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OR

13(b). Read the following paragraph and answer the questions that follow:

Biotechnology revolves around the "gene of interest", with an objective to open various avenues for human welfare in health, medicine, pharma, agriculture etc. using different techniques, tools and processes. One of the breakthroughs of biotechnology in medicine is the gene therapy.

- (i) Name the human disease for which the gene therapy was used for the first time.
 - (ii) Explain the steps of gene therapy carried to cure the disease using the lymphocytes of the patient. Why is this therapy not a permanent cure of the disease?
 - (iii) Write the possible permanent cure of the disease by the gene therapy that is in progress.
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