

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. Give your interpretation of the message given by ecologist Paul Ehrlich through his analogy "rivet popper hypothesis" to human race.

2. What are proto oncogenes and why are they called so?

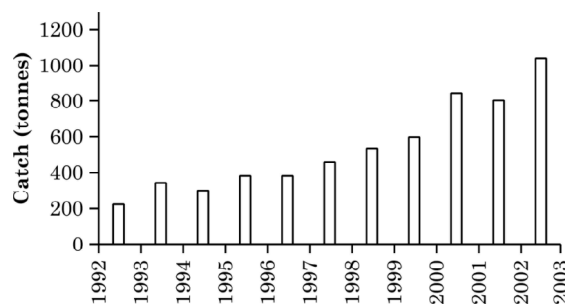
3. State the impact of constant mechanical agitation and pumping of air in the aeration tank on the sewage during the biological treatment.

OR

3. (a) Cattle excreta is important source for producing a domestic fuel. Name the fuel and write its main components.

(b) Write the biological process that is responsible for the production of this fuel.

4. The histogram given below representing the data for annual shark harvest in the great barrier reef / coral reef located on the east coast of Queensland, Australia. Study the histogram and answer the questions that follow.



(a) Write your interpretation of the data given.

(b) Write the impact on the biodiversity of the area that you can interpret on the basis of given data.

OR

4. "Stability of community depends upon its species richness." How did David Tilman show this experimentally?

5. What is the importance of female Anopheles mosquitoes in the life of a malarial Parasite Plasmodium?

6. Mention the parts of human body that get affected by Pneumonia and common cold infections. Write the causative agents of the two diseases.

Section B

7. Read the account of a natural large forest area that underwent many changes from the year 2002 to 2014 and answer the question that follow:

In 2002 there was a large area of natural forest habitat in a country. In 2007 a canal was built midway through this natural area. This was required to meet the irrigation demand of the nearby areas. In 2014, Ecologists suggested to create green corridors connecting two fragmented parts of the initial large natural forest habitat. Explain the reason behind such suggestion by ecologists.

8. Enumerate the main sources of bio-fertilisers giving one example of each.

9. Explain giving reason the action plan followed by organic farmers that support their key belief "biodiversity furthers health of crop lands".

10. (i) State the role of a selectable marker in r-DNA technology.

(ii) Name one such selectable marker which is considered to be useful for *E. coli*.

(iii) Give one reason why is it considered to be a useful marker.

OR

10. What are plasmids? How are they different from cloning vectors? Give one example each for a viral and a bacterial cloning vector.

11. Name any three techniques used for introducing an alien DNA into a host cell and mention how?

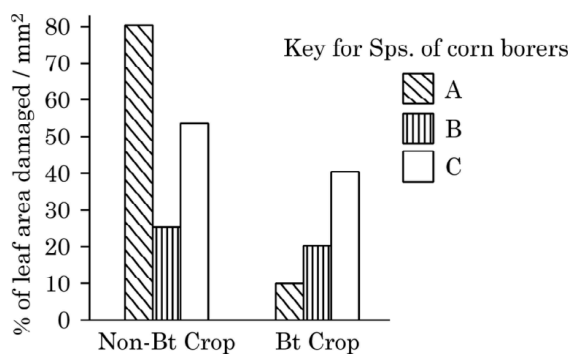
12. Bio-diversification of life started to occur almost 3 billion years ago. Since then new species have been evolving and then disappearing en masse from earth.

(a) How many episodes of mass extinctions of species have already taken place and which one is in progress in the current era?

(b) How is current episode in progress different from the previous episodes and why? Explain.

OR

13. To save the crop plant from the attack of various insect pests the biotechnologists have developed many pest resistant plants. One such example is Bt corn plant. In this plant 'cry' genes were introduced which produces cry-proteins in the plant that has toxic effect on the pest (corn borer). Thus saves the corn plant from the attack of the corn borer. An experimental field study was conducted by the scientists to see the efficacy of the Bt corn plant against the attack of corn borers. Three different species of corn borers namely 'A', 'B', 'C' were collected and were independently fed on non Bt corn plants and Bt corn plants separately for the same period. The extent of the damage caused to the leaf area of the plant was observed and noted down. With the help of the observations and data collected the following bar graph was plotted. Study the graph and answer the questions that follow.



- Identify the species of the corn borer that was most successfully controlled by Bt corn plant. Give appropriate reason for your inference.
- Identify the species of the corn borers which shows least impact of toxin produced by Bt genes.
- What would be your advise as a Scientist, to the farmers for growing this particular Bt corn variety in the area which is infested by species-'B' of corn borers?
- Name one Bt gene that encodes protein in corn plants to control corn borers.

13. A gene was identified in a fungus by a research worker in a lab which was considered to be of a great importance in the field of agriculture. As a student of biotechnology, write the steps you would suggest to (i) Isolate this gene of interest from the fungus and (ii) amplify this gene for further experimentation and research.

- End of Question Paper -