

## 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) The question paper has three sections: A, B and C.
- (iii) Section A contains 6 questions of 2 marks each. Section B contains 6 questions of 3 marks each. Section C has one case-based question of 5 marks.
- (iv) There is no overall choice. Internal choices are provided in some questions; attempt only one of the choices in such questions.

## Section A

1. Construct a flowchart showing the action of t-PA (tissue plasminogen activator).

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2. Why can foaming cause problems in microbiological processes ?

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3. What information can be obtained from the following Database retrieval tools ? (a) Locus link (b) Taxonomy browser

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4(a). Ripening of fruits has been slowed down to prevent their spoilage during transportation. How ?

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OR

4(b). Plants have adapted to cope with abiotic stress conditions. How ?

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5(a). What is 'Golden Rice' ? How is it developed ?

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OR

5(b). What are Cybrids ? Name any two cytoplasmic traits that can be transferred using Cybrids, from one plant species to another.

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6. Enlist important differences between finite and continuous cell lines.

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## Section B

7. (a) Why is regulation of pH important for survival of mammalian cells in culture ? Write two reasons. (b) How does bicarbonate – CO<sub>2</sub> buffering system work ?

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8. What is RefSeq ? Give its significance. (any 2 points)

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9. (a) A medium for microbial culture contains components like peptone, meat extract, yeast extract, casein digest and corn steep liquor. This culture medium is a complex medium. Why ? (b) Why is agar added to any nutrient medium ? (c) What are the conditions for sterilization of culture medium in an autoclave ?

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10(a). Animal cell cultures are placed in CO<sub>2</sub> incubators, as they help to reproduce environmental conditions close to the living cells. How ?

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OR

10(b). “Serum is an important component of animal cell culture.” Support the statement giving two reasons. Why are antibiotics added to culture medium ?

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11. How can a farmer eliminate the process of emasculation to prevent unnecessary pollination in his maize crop ? Can normal pollen formation be ensured at the onset of breeding seasons ?

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12. Draw a labelled diagram of an artificial seed. Why are these seeds produced ?

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### 12. For Visually Impaired Candidates Only

What are artificial seeds ? Why are they produced ?

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## Section C

### 13(a). Microbial Cultures :

Microbial cultures have immense potential for production of very useful compounds. These cultures can be exploited mainly to produce different metabolites which include enzymes, steroids, antibiotics, therapeutic proteins, microbial leaching, biodegradable waste treatment, etc.

**13(a)(i).** Give an example where microbial metabolism has been used to convert unsuitable substrates to useful products.

**13(a)(ii).** Define DSP. Why is it advisable to use less number of steps in a DSP protocol ?

**13(a)(iii).** What are excipients ?

**13(a)(iv).** Which organisms are referred to as GRAS ?

**13(a)(v).** Briefly mention two biosafety issues specific in microbial technology.

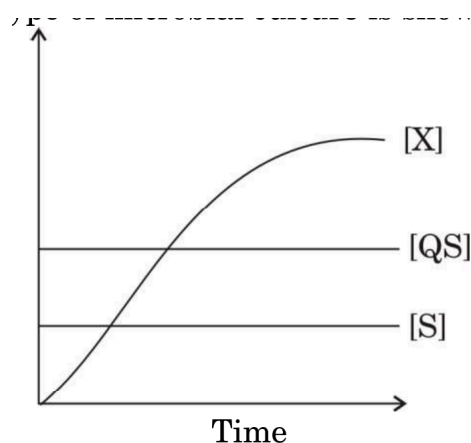
OR

### 13(b). Continuous Culture :

To get a continuous supply of microbial growth, continuous culture is used. The growth medium is designed in such a way that one of the nutrients is in limited quantity. Nutrients are continually added to the bioreactor and spent culture broth is removed at the same time. This culture helps to obtain stable product quality and higher productivity per unit volume, so this technique is widely used for production of both microbial biomass as well as their metabolites.

**13(b)(i).** Differentiate between turbidostat and chemostat.

**13(b)(ii).** Which type of microbial culture is shown in this graph ?



**13(b)(ii). For Visually Impaired Candidates Only, in lieu of (ii)**

What is Batch Culture ?

**13(b)(iii).** How is continuous culture different from Fed-Batch culture in terms of volume in the culture vessel ? In which type of method can microbial culture be maintained in an extended log or stationary phase ?

- End of Question Paper -