Total number of printed pages:3

PG/1st/PFET103

2021

RECENT ADVANCES IN ENZYME AND MICROBIAL TECHNOLOGY

Full Marks: 100

Time: Three hours

The figures in the margin indicate full marks for the questions.

*Attempt questions from **Both Groups** as per the following instructions:*

Group -A:
Attempt Any Five Questions of the following

5 × 10

1. Briefly elaborate on the structure of DNA using a simple schematic diagram. 10

2. Describe the principle of polymerase chain reaction (PCR) using a simple schematic diagram explaining the three major steps of PCR – Denaturation, Annealing and Elongation. 10

3. Elaborate on the following fermentation products' importance in food preservation. – (a) Organic acid, (b) Ethanol and other alcohols, (c) Bacteriocins 10

4. Explain the principles of DNA microarray technique. Use simple schematic diagram. 10

5. What are microbial insecticides? List two advantages and two disadvantages of microbial insecticides. Elaborate on nematodes as microbial insecticide, and explain their mode of action, 2 + 4 + 4

6. Describe malting and mashing in beer processing, and what are their importance in beer fermentation? What is wort? What are the important functions of hops in beer making? 6 + 1 + 3

Group-B

Attempt Any Five Questions of the following **5x10**

7. Describe with suitable flow diagram the koji method of enzyme production. How does α-amylase is prepared by submerged culture fermentation? Mention the recovery of it with suitable flow diagram. 4+3+3

8. Briefly pointed out the application of enzymes in food processing and analytical sectors. Give the mechanism of actions of starch splitting enzymes. 5+5

9. Describe both the reversible and irreversible mode of enzyme immobilization techniques. Explain two potential industrial applications of immobilized enzyme technology. 7+3

10. Cite few examples of natural and synthetic support/matrix materials w.r.t. enzyme immobilization. State the disadvantages of immobilized enzyme technology. Explain gel entrapment technique with figure. What is the economic feasibility of enzyme immobilization method? 4+2+2+2

11. Give some examples of cross linking agent. Describe one suitable method of whole cell immobilization technique with potential applications. 2+8

12. Describe the production and purification strategy of lipase. Briefly discuss the biocatalysis with synthesis of organic materials. 6+4

13. What do you understand by biofuel? What is meant by biogas? Describe the mechanism of formation of biogas through anaerobic digestion process. 1+1+8

14. Briefly mention the layout of fermentation process. Describe the standard design criterias of a fermenter with it's diagram. State the different aeration devices in a fermenter. 3+5+2

15. Explain with a suitable flow diagram the protein isolation and purification techniques. How protein is characterized? What do you understand by proteomics? 4+4+2