ADVANCED ENZYME TECHNOLOGY
(BTC5131)

Time Allotted : 2½ hrs **Full Marks : 60**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 4 (four) from Group B to E, taking one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A

1. Answer any twelve: **12 × 1 = 12**

Choose the correct alternative for the following

(i) Cavitation phenomenon is observed in
(a) Bead milling (b) Ultrasonication
(c) Homogenization (d) Thermolysis

(ii) The design of which reactor does not allow for control of pH by addition ofacids or bases
(a) CSTR (b) Packed Bed Reactor
(c) Hollow Fibre Reactor (d) Bubble Column Reactor

(iii) In which immobilization technique, semi-permeable membrane is used?
(a) Adsorption (b) Covalent Binding
(c) Encapsulation (d) Cross-linking

(iv) Xylanase enzyme is mainly used in
(a) Paper industry (b) Textile industry
(c) Brewing industry (d) None of these

(v) Subtilisin is type of
(a) Protease (b) Amylase
(c) Cellulase (d) None of these

(vi) Biopolishing is mainly occur in presence of
(a) Cellulase (b) Protease
(c) Lipase (d) None of these

(vii) The enzyme used to treat leukaemia is
(a) Asparaginase (b) Glutaminase
(c) Both (d) None

(viii) Heart attack can be treated by the enzyme
(a) Hyaluronidase (b) Streptokinase
(c) Uricase (d) Ribonuclease

(ix) A calorimetric biosensor makes use of
(a) Changes in charge distribution producing an electrical potential during any biochemical reaction
(b) Heat output of a reaction
(c) Light absorbed during a reaction
(d) Difference in the mass of reactants and products

(x) What can be used as biosensor element
(a) Enzyme (b) Whole cell
(c) Antibody (d) All of these

Fill in the blanks with the correct word

(xi) Recombinant lipase is used in detergent industry is _____.

(xii) _____ belong to the E.C. group of 3.

(xiii) The time taken for a mobile phase to pass down the column is known as _____.

(xiv) Cyanogen activation of the matrix is used in _____ method of immobilization.

(xv) One example of wearable biosensor is _____.

Group - B

2. (a) Name the six classes of enzymes. *[(CO1)(Remember/LOCQ)]*
(b) Explain the role of osmotic shock in cell lysis. *[(CO2)(Apply/IOCQ)]*
(c) What do you mean by cofactors of enzymes? *[(CO1)(Understand/LOCQ)]*
(d) Describe how the bead mills can be used to lyse the cells. *[(CO2)(Explain/HOCQ)]*

2 + 4 + 2 + 4 = 12

3. (a) Write notes on Rotary vacuum filter drum. *[(CO2)(Explain/IOCQ)]*
(b) Illustrate the effects of temperature on enzyme activity. *[(CO1)(Analyse/IOCQ)]*
(c) Enumerate the role of centrifugation in separating particles of varying masses. *[(CO2)(Explain/IOCQ)]*

4 + 4 + 4 = 12

Group - C

4. (a) Illustrate the process of precipitating protein with the help of ammonium sulphate? *[(CO3)(Illustrate/HOCQ)]*
(b) Enumerate the principle of Size Exclusion Chromatography. *[(CO3)(Analyse/HOCQ)]*
(c) Design Bubble Column Reactor as Immobilized Enzyme Bioreactor. *[(CO3)(Design/IOCQ)]*

4 + 4 + 4 = 12

5. (a) Illustrate the components of the Affinity Chromatography. *[(CO3)(Illustrate/IOCQ)]*
(b) Comment on the advantages of Enzyme Immobilization. *[(CO3)(Comment/LOCQ)]*
(c) Discuss the process of preparing a column in Column chromatography. *[(CO3)(Discuss/HOCQ)]*

(d) Illustrate the process of immobilizing the enzymes by Encapsulation method. *[(CO3)(Illustrate/IOCQ)]*

4 + 2 + 2 + 4 = 12

Group - D

6. (a) Explain how carcinogenic product formation is inhibited in baking industry. *[(CO3)(Analyse/HOCQ)]*

(b) Analyse the role of gluten in baking industry. *[(CO3)(Analyse/HOCQ)]*

(c) Mention the role of any two recombinant enzymes in detergent industry. *[(CO3)(Analyse/HOCQ)]*

4 + 4 + 4 = 12

7. (a) Name one hemicellulose and mention its role in one industry. *[(CO4)(Remember/LOCQ)]*

(b) Analyse the application of enzymes in beer production. *[(CO3)(Analyse/HOCQ)]*

(c) Compare the mode of action between glucose isomerase and glucose oxidase. *[(CO2)(Apply/IOCQ)]*

4 + 4 + 4 = 12

Group - E

8. (a) Describe the design and mechanism of a biosensor taking any one exothermic reaction as example. *[(CO2)(Apply/IOCQ)]*

(b) What are the desirable characteristics of a successful biosensor? *[(CO3)(Analyse/HOCQ)]*

(c) Mention few uses of biosensors in modern days. *[(CO2)(Apply/IOCQ)]*

4 + 4 + 4 = 12

9. (a) What are the disadvantages of using enzymes as therapeutic agents? How that can be overcome? *[(CO3)(Analyse/HOCQ)]*

(b) Mention the role of following enzymes in treatment of various diseases, mentioning the biochemical reations catalysed by them:

(i) Uricase

(ii) β-lactamase. *[(CO3)(Analyse/HOCQ)]*

(3 + 3) + (3 + 3) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	10.42	41.67	47.91