

ADVANCED ENZYME TECHNOLOGY  
(BIOT 5102)

Time Allotted : 3 hrs

Full Marks : 70

*Figures out of the right margin indicate full marks.*

*Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.*

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

**Group - A**  
**(Multiple Choice Type Questions)**

1. Choose the correct alternative for the following: **10 × 1 = 10**

- (i) Competitive enzyme inhibition is released by  
(a) high substrate (b) low substrate  
(c) metal ion (d) reducing agent.
- (ii) Force(s) of attraction involved between solute and solvent in adsorption chromatography is/are  
(a) dipole-dipole attraction (b) Vanderwaal's force  
(c) weak covalent forces (d) all of the above.
- (iii) Good Large centrifuge should have  
(a) large V/r (b) low V/r  
(c) any V/r (d) none of the above.
- (iv) Lignin mainly consist of  
(a) aromatic alcohol (b) aliphatic alcohol  
(c) aromatic hydrocarbon (d) aliphatic hydrocarbon.
- (v) Breaking of fungal mycelia is best done by  
(a) sonication (b) enzyme treatment  
(c) X-Press (d) ball mill.
- (vi) Alkaline protease is mainly used in  
(a) detergent industry (b) textile industry  
(c) dairy industry (d) paper industry.
- (vii) Which of the following isotherms can be used to describe the binding dynamics of a Column chromatography?  
(a) Linear (b) Langmuir  
(c) Freundlich (d) All of the above.

- (viii) Debye-Huckel theory explains the process of  
(a) Salting in (b) Salting out  
(c) Adsorption Chromatography (d) None of the above.
- (ix) Purification of an enzyme is monitored by  
(a) Units recovered (b) Proteins recovered  
(c) Specific activity (d) All of these.
- (x) The enzyme that potentially can be used to treat heart attack is  
(a) Insulin (b) Hyaluronidase  
(c) Beta-lactamase (d) Ribonuclease.

**Group - B**

2. (a) Name the different types of enzyme reaction mechanisms known.  
(b) What is Line weaver – Burk plot?  
(c) How is it prepared?  
(d) Draw a sketch diagram to show how Km and Vmax are determined?  
**4 + 2 + 2 + 4 = 12**
3. (a) What are the different methods available for breaking microbial cells?  
(b) Shortly describe functioning of each method.  
**2 + 10 = 12**

**Group - C**

4. (a) Describe the working principle of Ion Exchange Chromatography.  
(b) Describe the mechanism of Salting in and Salting out.  
**6 + 6 = 12**
5. Briefly describe the different methods of immobilizing the enzymes.  
**12**

**Group - D**

6. (a) Discuss the functions of different enzymes in textile industry.  
(b) Distinguish between the mode of action of amylase and cellulase.  
**6 + 6 = 12**

7. (a) What is lactose intolerance?  
(b) What is the function of penicillin acylase?  
(c) Distinguish the mode of action of glucose isomerase and glucose oxidase.  
(d) What is desizing?

$$2 + 4 + 4 + 2 = 12$$

**Group - E**

8. (a) Define artificial enzyme.  
(b) How can enzymes be used in the treatment of cancer?  
(c) Genetic engineering has a huge potential for economic enzyme production — discuss.

$$2 + 4 + 6 = 12$$

9. (a) What are biosensors?  
(b) Discuss the ideal characteristics of a successful biosensor.  
(c) Draw a schematic diagram showing the main components of a biosensor.

$$2 + 4 + 6 = 12$$