

**ADVANCED ENZYME TECHNOLOGY
(BIOT 5131)**

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) 1 U of Enzyme is equal to
 - (a) 16.67 nanokatal of enzyme
 - (b) 67.16 nanokatal of enzyme
 - (c) 30.16 nanokatal of enzyme
 - (d) none of these.
- (ii) Glutathione is a tripeptide of
 - (a) Glu-Cys-Gly
 - (b) Cys-Gly-Glu
 - (c) Cys-Leu-Glu
 - (d) Leu-Glu-Cys
- (iii) In gel chromatography, if V_g = Volume of the beads, V_i = Volume of the pores, V_o = Void Volume and V_t = Total Volume
 - (a) $V_t = V_g + V_i - V_o$
 - (b) $V_t = V_g + V_i + V_o$
 - (c) $V_g = V_t + V_i + V_o$
 - (d) $V_t = V_g - V_i - V_o$
- (iv) Relation among Partition coefficient(K), retention factor(k) and Phaseration(β) is
 - (a) $k = K/\beta$
 - (b) $\beta = Kk$
 - (c) $K = k/\beta$
 - (d) $K = k\beta$
- (v) Modification of antibiotic occur in presence of
 - (a) Penicillin acylase
 - (b) Xylanase
 - (c) Cellulase
 - (d) None of these
- (vi) In which immobilization technique, cyanogen bromide activation is done?
 - (a) Adsorption
 - (b) Covalent Binding
 - (c) Entrapment
 - (d) Cross-linking.
- (vii) DE value determination occur during the preparation of
 - (a) Corn syrup
 - (b) Grapes juice
 - (c) Beer
 - (d) None of these.
- (viii) The light absorbance difference during a biochemical reaction is measured in
 - (a) a potentiometric biosensor
 - (b) a piezo-electric biosensor
 - (c) an optical biosensor
 - (d) a calorimetric biosensor

- (ix) The Clark O₂ electrode is a/an
 (a) Calorimetric biosensor (b) Potentiometric biosensor
 (c) Oxygen biosensor (d) Amperometric biosensor
- (x) Cancer potentially can be prevented by
 (a) Injecting with ribonuclease
 (b) Starving the tumor with asparaginase
 (c) Starving the body with Asparagine
 (d) None of these.

Fill in the blanks with the correct word

- (xi) Glucose isomerase enzyme is mainly used in _____ preparation.
- (xii) Glutaraldehyde is used in _____ method of enzyme immobilization.
- (xiii) If the solvent in a column chromatography is allowed to flow down by gravity, it is called _____ chromatography.
- (xiv) The ratio of the molar concentration in the solid phase to the molar concentration in the liquid phase is known as _____.
- (xv) Thermistors are used in _____ biosensors.

Group - B

2. (a) Enumerate the mechanism of enzyme action. [[C01](Analyse/HOCQ)]
 (b) Write notes on three types of enzyme inhibitors. [[C01](Explain/IOCQ)]
 (c) Illustrate the role of High Pressure Homogenisers in cell lysis. [[C02](Apply/HOCQ)]
4 + 4 + 4 = 12
3. (a) Illustrate the effects of substrate concentration on enzyme activity. [[C01](Analyse/IOCQ)]
 (b) What are the advantages of microbial enzymes over other sources of enzymes? [[C01](Understand/LOCQ)]
 (c) Illustrate the role of Ultrasonic cell disruption in cell lysis. [[C02](Describe/HOCQ)]
4 + 3 + 5 = 12

Group - C

4. (a) Derive the relation between Partition coefficient, Phase ratio and Retention factor. [[C03](Derive/IOCQ)]
 (b) Design Packed Bed Reactor as Immobilized Enzyme Bioreactor. [[C03](Design/IOCQ)]
 (c) State the advantages of Entrapment method of enzyme immobilization. [[C03](Understand/LOCQ)]
4 + 5 + 3 = 12
5. (a) Briefly describe the process of Glutathione purification by GST tagged method. [[C03](Describe/HOCQ)]
 (b) Design CSTR as Immobilized Enzyme Bioreactor. [[C03](Design/HOCQ)]

- (c) State the characteristics of an ideal adsorbent. [[CO3](Remember/LOCQ)]
4 + 5 + 3 = 12

Group - D

6. (a) Mention the role of asparaginase and glucoamylase in baking industry. [[CO3](Analyse/HOCQ)]
 (b) Analyse the mode of action of penicillin acylase. [[CO3](Analyse/HOCQ)]
 (c) Mention the role of biopulping in paper industry. [[CO2](Apply/IOCQ)]
4 + 4 + 4 = 12
7. (a) Compare the mode of action between liquefying amylase and saccharifying amylase. [[CO3](Analyse/HOCQ)]
 (b) Analyse the application of different enzymes in wine production. [[CO3](Analyse/HOCQ)]
 (c) Write the name of any one recombinant enzyme and its application. [[CO2](Apply/IOCQ)]
 (d) Mention the mode of action of alpha galactosidase. [[CO2](Apply/IOCQ)]
4 + 4 + 2 + 2 = 12

Group - E

8. (a) What are non-invasive biosensors? Give examples. [[CO3](Analyse/HOCQ)]
 (b) Genetic engineering has a huge potential for economic enzyme production — Discuss. [[CO2](Apply/IOCQ)]
 (c) Discuss the working principle of a potentiometric biosensor with a suitable diagram. [[CO2](Apply/IOCQ)]
(2 + 2) + 3 + 5 = 12
9. (a) How asparaginase has been found to be promising in treatment of tumors? Mention its mechanism of action. [[CO3](Analyse/HOCQ)]
 (b) What enzyme can be used to treat leukaemia? Discuss its mechanism of action. [[CO2](Apply/IOCQ)]
(3 + 3) + (3 + 3) = 12

Cognition Level	LOCQ	IOCQ	HOCQ
Percentage distribution	9.38	40.62	50

