**M.TECH/BT/1ST SEM/BIOT 5131/2021**

# ADVANCED ENZYME TECHNOLOGY
## (BIOT 5131)

**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) Oxido-reductase belong to E.C group of
(a) 1 (b) 4 (c) 6 (d) 2

(ii) Sodium sulphide is used in
(a) Detergent Industry (b) Leather industry
(c) Paper Industry (d) Textile Industry

(iii) Glutathione is a tripeptide of
(a) Glu-Cys-Gly (b) Cys-Gly-Glu
(c) Cys-Leu-Glu (d) Leu-Glu-Cys

(iv) The enzyme that potentially can be used to treat heart attack is:
(a) Insulin (b) Hyaluronidase
(c) Beta-lactamase (d) Ribonuclease

(v) Range of mesh values of silica gel used in Flash chromatography is
(a) 70-140 (b) 140-230
(c) 230-400 (d) 400-500

(vi) Alkaline protease is mainly used in
(a) Detergent Industry (b) Leather industry
(c) Paper Industry (d) Textile Industry

(vii) Removal of tanin is essential for production of
(a) Bread (b) Wine
(c) Beer (d) Aliphatic hydrocarbon

(viii) Relation among Partition coefficient(K), retention factor(k) and Phase ratio(β) is
(a) $k=K/\beta$ (b) $\beta=kK$
(c) $K=k/\beta$ (d) $K=k\beta$

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

(x) Isocratic condition in HPLC takes place when mobile phase composition
(a) Decreases with time (b) Increases with time
(c) Remains constant with time (d) None of these

## Group - B

2. (a) Discuss the factors which affect the enzyme activity. [(CO1) (Analyse/IOCQ)]
(b) Illustrate the two models which describe the enzyme-substrate specificity. [(CO1) (Illustrate/HOCQ)]

**7 + 5 = 12**

3. (a) Describe the process of breaking the cells by Bead mills? [(CO2) (Analyse/IOCQ)]
(b) What is a Co-factor? [(CO1) (Remember/LOCQ)]
(c) Distinguish between a catabolic and an anabolic reaction. [(CO1) (Compare/IOCQ)]

**6 + 2 + 4 = 12**

## Group - C

4. (a) Discuss the process of precipitating protein with the help of trichloro acetic acid (TCA)? [(CO3) (Discuss/IOCQ)]
(b) State the advantages and disadvantages of TCA as a precipitating agent. [(CO3) (Remember/LOCQ)]
(c) Illustrate the working principle of size exclusion chromatography. [(CO3) (Analyse/IOCQ)]

**4 + 3 + 5 = 12**

5. (a) What is meant by Retardation Factor ($R_f$) of a compound in chromatography? [(CO3) (Remember/LOCQ)]
(b) Derive the relation of partition coefficient, retention factor and phase ratio of a compound. [(CO3) (Derive/HOCQ)]
(c) What are the limitations of enzyme immobilization? [(CO3)(Understand/LOCQ)]

**4 + 4 + 4 = 12**

## Group - D

6. (a) What is the function of penicillin acylase and how it is immobilised? [(CO4) (Understand/LOCQ)]
(b) Distinguish between the mode of action of glucose isomerase and glucose oxidase. [(CO5) (Analyse/IOCQ)]
(c) What is desizing? [(CO4) (Remember/LOCQ)]

**3 + 6 + 3 = 12**

7. (a) What is biopolishing? Analyze the role of enzyme for biopolishing. [(CO4) (Analyze/IOCQ)]
   (b) Illustrate the process of production of sweet wine? [(CO4) (Analyse/IOCQ)]
   (c) What is leather baiting? [(CO6) (Understand/LOCQ)]

**6 + 3 + 3 = 12**

## Group - E

8. (a) Define biosensors? [(CO5) (Remember/LOCQ)]
   (b) Discuss the features that an ideal biosensor must possess. [(CO6) (Analyse/IOCQ)]
   (c) Illustrate with a schematic diagram the main components of a biosensor. [(CO5) (Illustrate/HOCQ)]

**2 + 4 + 6 = 12**

9. (a) What is meant by artificial enzyme? [(CO5) (Remember/LOCQ)]
   (b) Describe the role of two different enzymes in treatment of leukemia. [(CO5) (Critique/HOCQ)]

**4 + (4 + 4) = 12**

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| Cognition Level | LOCQ | IOCQ | HOCQ |
|---|---|---|---|
| Percentage distribution | 29.16% | 46.88% | 23.96% |

**Course Outcome (CO):**

After completion of this course, the students should be able to:

1. Students will be able to describe the mechanism of enzyme actions.
2. Students will be able to design general protocol for processing of enzymes from different sources.
3. Students will be able to describe different methods for purification and immobilization of enzymes.
4. Students will be able to apply enzymes in various industries that can benefit human life.
5. Students will be able to develop various enzyme biosensors for therapeutic purposes.
6. Students will be able to interpret future prospects of Enzyme Technology.

*LOCQ: Lower Order Cognitive Question; IOCQ: Intermediate Order Cognitive Question; HOCQ: Higher Order Cognitive Question

| Department & Section | Submission Link |
|---|---|
| BT | https://classroom.google.com/c/NDc3Mzg0OTUxMTY2/a/NDc3Mzg3MTk4MDE3/details |