MBC–004

M. SC. (BIOCHEMISTRY) (MSCBCH)
Term-End Examination
June, 2025

MBC-004 : ENZYMES AND THEIR APPLICATIONS

Time : 3 Hours   *Maximum Marks : 100*

Note : *Answer any **five** questions. All questions carry equal marks.*

1. (a) Explain the thermodynamics of enzyme catalyzed reaction.   10

   (b) Write short notes on the following :

   $$4 \times 2\frac{1}{2} = 10$$

   (i) Conjugate enzyme

   (ii) Prosthetic group

   (iii) EC number of enzyme

   (iv) Lyases

2. (a) Discuss the Fischer's lock and key hypothesis. List its limitations and explain Induced-fit model of enzyme catalysis.   10

(b)   Give an overview of acid-base catalysis of enzymes.   10

3. (a)   Derive Michaelis-Menten equation and draw its plot.   12

(b)   Derive Lineweaver-Burk equation and draw double reciprocal plot.   8

4. (a)   Draw primary plots and explain their usage for differentiating bisubstrate mechanisms.   8

(b)   Distinguish between the following :

$3 \times 4 = 12$

(i)   Competitive and Non-competitive enzyme inhibition

(ii)   Reversible and Irreversible enzyme inhibition

(iii) Stopped and Continuous flow techniques

5. (a)   How does compartmentation help to control metabolic pathways ? Give examples.   8

    (b) What are allosteric enzymes ? Give examples. Explain Hill equation and its coefficient.   12

6. Write notes on the following :   10+10

    (a) Nomenclature of Isozymes with examples.

    (b) Fatty Acyl Synthase Multienzyme complex

7. Explain the methods of enzyme purification based on the following parameters :

    10+10=20

    (a) Size or mass

    (b) Polarity

8. (a) Describe the applications of enzymes in the following (any *two*) :   5+5

       (i) Diagnostics

       (ii) Agriculture

       (iii) Fruit and Wine industry

    (b) Explain the binding methods of enzyme immobilization.   10

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