Printed Pages: 02   **Sub Code: NBT403**

Paper Id: | 154246 | **Roll No.** | | | | | | | | | | |

B TECH
(SEM IV) THEORY EXAMINATION 2018-19
ENZYME ENGINEERING

Time: 3 Hours   **Total marks: 100**
Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION – A

1. Attempt all parts. All parts carry equal marks.   **[2x10=20]**

    a. What do you meant by active site?
    b. Name the different classes of enzyme as per IUB system.
    c. What do you understand the turnover number?
    d. What is the difference between uncompetitive and non competitive inhibition?
    e. What do you understand by enzyme biosensor?
    f. What is the difference between co-enzyme and co-factor?
    g. What do you meant by substrate and product inhibition?
    h. What do you understand by apoenzyme?
    i. What is the role of encapsulation in enzyme immobilization?
    j. Define K_m.

SECTION – B

2. Attempt any **three** parts. All parts carry equal marks.   **[3x10=30]**

    a. What do you meant by enzyme electrodes? Describe the design of enzyme electrodes.
    b. What do you understand by enzyme assay? Discuss the development of enzyme assay.
    c. Describe Lock and key hypothesis with suitable example.
    d. What do you understand by allosteric regulation of enzyme? Explain allosteric regulation of enzyme with suitable example.
    e. Describe the applications of immobilize enzyme.

SECTION – C

3. Attempt any one part   **10x1=10**

    a) What do you meant by enzyme inhibition? Discuss the allosteric regulation of enzyme.
   b) Describe the design of Fluidized bed bioreactor in brief.

4. Attempt any one part   **10x1=10**

    a. What do you understand by ED plot? Discuss the importance of ED plot.
    b. What do you meant by single substrate reaction? Establish a Michaelis-Menten model for given substrate reaction:

$$E+S \longleftrightarrow ES \longrightarrow P+E$$

5. Attempt any one part $\qquad$ **10x1=10**

    a) What is the difference between inhibitor and activator? Enlist the various factors which affect the velocity of enzyme catalyzed reaction.

    b) Explain the Lineweaver-Burk model for competitive and uncompetitive inhibition reactions. Also describe following graph represent the type of inhibition:

(A)   (B)   (C)
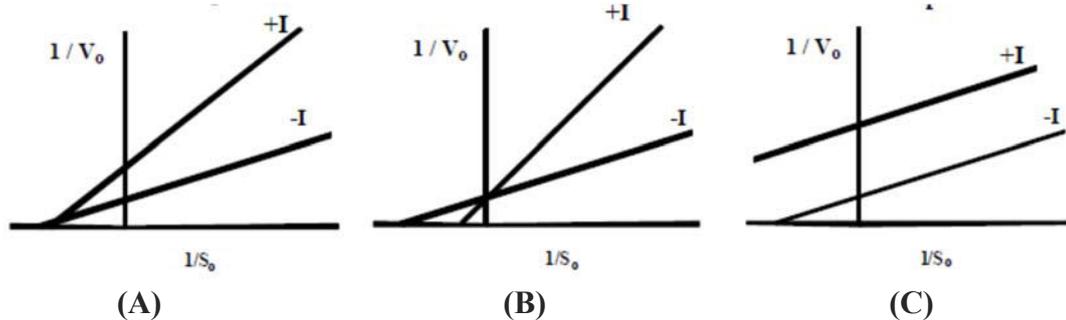
6. Attempt any one part. $\qquad$ **10x1=10**

    a) What are biosensors? How do they function? Explain their principle and applications.

    b) Discuss the various steps involved in the purification of enzymes.

7. Attempt any one part. $\qquad$ **10x1=10**

    a) What do you meant by enzyme immobilization? Discuss the importance of enzyme immobilization. Describe the different methods used for enzyme immobilization.

    b) For an enzyme (5µM), the following initial velocities have been reported depending on the substrate concentration:

[S], mM	V_0 mMs^{-1}
0.02	10.83
0.04	18.57
0.07	26.76
0.10	32.50
0.15	39.00
0.20	43.33
0.30	48.75
0.50	54.17
0.70	56.88

    i. Draw a Michaelis-Menten plot for this enzyme.

    ii. Draw a Lineweaver-Burk plot for this enzyme.

    iii. Determine K_m and V_{max} for this enzyme.

    iv. Indicate in both graphs (a & b) where K_m and V_{max} can be recognized.