

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI**  
**(END SEMESTER EXAMINATION)**

**CLASS: B. TECH**  
**BRANCH: BIOTECH**

**SEMESTER: IV<sup>th</sup>**  
**SESSION: SP/2024**

**SUBJECT: BE216 ENZYME TECHNOLOGY**

**TIME: 3 HOURS**

**FULL MARKS: 50**

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q1 (a) With suitable example, describe any one mechanism of enzyme action. [5] CO1 BL2
- Q1 (b) Suppose you are determining enzyme specific activity. The sample contains 50  $\mu\text{g}$  of total protein estimated by Bradford method. After incubating with substrate for 30 min you obtained the product with OD500 value of 0.87. The equation of standard plot prepared separately (OD vs. concentration) with product is  $Y = 0.29X$ . Concentration is measured in  $\text{mg/mL}$ . Calculate the specific activity of the enzyme ( $\text{mg/mL} \cdot \text{min}$ ). [5] CO1 BL4
- Q2 Calculate graphically the value of  $K_m$  and  $V_{\text{max}}$  from the following data [10] CO2 BL5
- | S (M)              | V (nmole/L/min) |
|--------------------|-----------------|
| $7 \times 10^{-6}$ | 20              |
| $8 \times 10^{-5}$ | 45              |
| $1 \times 10^{-5}$ | 60              |
| $1 \times 10^{-3}$ | 75              |
| $1 \times 10^{-2}$ | 80              |
- Q3 (a) Write the different primary screening techniques. [5] CO3 BL2
- Q3 (b) An enzyme has a  $K_m$  value of  $4.7 \times 10^{-5} \text{ M}$ , and  $V_{\text{max}}$  value of 25 mole/L/min. [5] CO3 BL5
- a. What will be the velocity in the presence of substrate concentration of  $2.5 \times 10^{-4} \text{ M}$  and competitive inhibitor concentration of  $3.5 \times 10^{-4} \text{ M}$  ( $K_i = 3 \times 10^{-4} \text{ M}$ )
- b. Calculate the degree of inhibition in this case.
- Q4 (a) Explain any one enzyme immobilization method. What are the advantages and disadvantages of that method? [5] CO4 BL3
- Q4 (b) Derive immobilized enzyme kinetic equation indicating Dam Kohler Number, when enzyme is on the surface of a matrix. [5] CO4 BL3
- Q5 (a) With example, briefly describe isoenzymes. [5] CO5 BL2
- Q5 (b) With reaction, explain any two enzymes that can be used for industrial purpose. [5] CO5 BL3

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