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

CLASS: BTECH **SEMESTER: IVth**
BRANCH: BIOTECH **SESSION: SP/2025**

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.

				CO	BL
Q1	(a)	With suitable example, describe the properties of an enzyme.	[5]	CO1	BL2
Q1	(b)	Suppose you are determining enzyme specific activity. The sample contains 100 µg 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 = 0.029X. Concentration is measured in mg/mL. Calculate the specific activity of the enzyme (mg/mL. min/mg protein).	[5]	CO2	BL4
Q2	(a)	Derive Michaelis–Menten enzyme kinetic equation for single substrate.	[5]	CO2	BL4
Q2	(b)	An enzyme has a Km value of 4.7×10^{-5} M, and Vmax value of 25 mole/L/min. a. What will be the velocity in the presence of substrate concentration of 2.5×10^{-4} M and non-competitive inhibitor concentration of 3.5×10^{-4} M ($K_i = 3\times10^{-4}$ M) b. Calculate the degree of inhibition in this case.	[5]	CO3	BL4
Q3	(a)	Write the overall flowchart of bacterial screening techniques used for industrially important enzyme production.	[5]	CO1	BL3
Q3	(b)	Describe the strategies used for purification of an extracellular enzyme.	[5]	CO2	BL3
Q4	(a)	Compare between adsorption and entrapment as enzyme immobilization methods, indicating principles, advantages and disadvantages of those methods.	[5]	CO2	BL3
Q4	(b)	Derive immobilized enzyme kinetic equation indicating Dam Kohler Number, when enzyme is on the surface of a matrix. Explain which regime you will prefer for immobilized enzyme and why?	[5]	CO3	BL4
Q5	(a)	With example, briefly explain different multi-enzyme complexes.	[5]	CO1	BL2
Q5	(b)	With examples, describe the therapeutic and analytical applications of enzymes.	[5]	CO2	BL3

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