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(February)

BIO-CHEMISTRY

(Honours)

(Proteins and Enzymes)

(BCHEM–301)

Marks : 56

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Answer *any* **four** questions

1. *(a)* Describe the criteria for determining the homogeneity of a protein. 7

   (b) Describe the underlying principle of Edman degradation method in protein sequencing. 7

2. *(a)* What are enzymes? How does an enzyme affect the activation energy of a reaction? 3+4=7

   (b) Discuss the general principle used in the classification of enzymes. 4

   (c) What are active sites? 3

(Turn Over)

3. *(a)* Describe the factors that affect rate of enzyme activity. 7

   (b) What are coenzymes? Discuss the structure and function of pyridoxal phosphate. 7

4. *(a)* Describe the mechanism of action of lysozyme. 10

   (b) What is the catalytic triad of chymotrypsin? 4

5. *(a)* Derive Michaelis-Menten equation under steady-state assumption. 9

   (b) Why do allosteric enzymes exhibit sigmoidal kinetics? 5

6. *(a)* What do you understand by the feedback regulation mechanism? 4

   (b) Given the following values of k_m, k_{cat} and k_{cat}/k_m, determine the types of inhibition for each of the following enzyme inhibitors. Explain how you would evaluate the type of inhibition for the given inhibitors : 10

Enzyme	k_m (mM)	$k_{cat}(s^{-1})$	$k_{cat}/k_m (M^{-1}s^{-1})$
No inhibitor	2·5	39	$1·56×10^4$
Inhibitor *1*	1·02	15·6	$1·56×10^4$
Inhibitor *2*	10	39	$3·90×10^3$
Inhibitor *3*	2·5	15·6	$6·24×10^3$

(Continued)

7. Describe any *two* of the following :   7×2=14

(a) Allosteric regulation

(b) Protein turnover

(c) Dialysis

(d) Zymogenicity

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