

2262

V.P.C. : 2491201

Name of Course : B Sc. (H) Biochemistry

Semester : II

Name of Paper : Enzymes F-4

Paper : BCH DC1.3

Medium : English

Time : 3 hours

Maximum Marks : 75

Instructions to candidates : Attempt Five questions in all Question
no. 1 is compulsory

(Log tables or scientific calculators may
be allowed)

1.a. Explain the following:

- (i) Enzymes catalyze chemical reactions by lowering the activation energy
- (ii) Enzyme activity of acetylcholine esterase is inhibited by DIFP
- (iii) Activity of the enzyme lactate dehydrogenase can be monitored by measuring absorbance at 340nm
- (iv) Amoxicillin and clavulanic acid are combined in a widely used pharmaceutical formulation used to treat bacterial infections
- (v) Histidine is a particularly useful amino acid residue in enzyme active sites

b. Define the following terms

- (i) Turnover number
- (ii) Activation energy
- (iii) Initial velocity
- (iv) Specific activity
- (v) Isozymes

c. Give an example of the following

- (i) A metalloenzyme
- (ii) An allosteric enzyme
- (iii) A therapeutic enzyme
- (iv) The enzyme present in tears

(10, 5, 4)

2.a. How will you distinguish between competitive and non competitive inhibition experimentally

b. Pyridoxal phosphate is a versatile coenzyme. Explain with three examples

c. Explain why serine-195 in chymotrypsin has a lower pKa than other serine residues

(5, 5, 4)

3.a. Explain why ATCase is an important regulatory enzyme and describe its mode of regulation

b. Write three important features of enzyme catalyzed reactions

- c. Explain why enzyme activities are measured under saturating substrate concentration (6, 4, 4)
- 4.a. Discuss the catalytic mechanism of the enzyme lysozyme
- b. What is the ratio of the [S] to K_M when the velocity of an enzyme catalyzed reaction is 80% of its V_{max} .
- c. Explain what parameters are used to assess the catalytic perfection of an enzyme (5, 5, 4)
- 5.a. Specific activity is a useful parameter in following the progress of purification of an enzyme. Comment.
- b. What are the various types of reversible enzyme inhibitions. How can these be distinguished by diagnostic plots.
- c. Give the names and structure of the cofactors of the following enzymes
 (i) Transaminase
 (ii) Pyruvate carboxylase (5, 5, 4)
- 6.a. Discuss with the help of an example how enzymes are regulated by reversible covalent modification
- b. Differentiate between the
 (i) Lock and key theory and Induced fit theory of catalysis
 (ii) Substrate binding and active site
- c. How will you distinguish between single and double displacement reactions kinetically (6, 4, 4)
7. Explain the following observations
- a. Chymotrypsin is resistant to self hydrolysis
- b. Enzymes affect reaction rates but not equilibrium
- c. Competitive inhibitors can protect enzymes from denaturation during purification
- d. Streptokinase is given to heart patients immediately after the attack

- e. The pH versus activity profile of the lysozyme shows a bell shaped curve
- f. Transition state analogs are powerful enzyme inhibitors
- g. Enzyme with high turnover number are used in enzyme immunoassays

(7X2)

- 8. Write short notes on the following
 - a. Applications of enzymes in medicine
 - b. Protease inhibitors as drugs
 - c. Suicide inhibitors

(5, 5, 4)