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SARDAR PATEL UNIVERSITY

M. Sc. (II Semester) Biochemistry (under CBCS) Examination
Friday, 13th April 2018
Time: 2.00 p.m. to 5.00 p.m.
Paper: PS02CBIC03 (Enzymology)

Total Marks: 70

N.B.: (i) Answers of all the questions (including multiple choice questions) should be written in the provided answer book only.
(ii) Figures in the right indicate marks.

Q1. Choose the most appropriate answer for the following multiple choice questions: (8)

1. The enzymes
   (a) increase total energy of activation
   (b) decrease total energy of activation
   (c) increase total energy of the product
   (d) increase the equilibrium constant

2. In competitive inhibition
   (a) Km is increased and Vmax is increased
   (b) Km is decreased and Vmax is normal
   (c) Km is increased and Vmax is normal
   (d) Km is decreased and Vmax is increased

3. Allosteric enzymes show all the following characteristics except,
   (a) Sigmoid kinetics
   (b) binding between substrate and regulatory sites
   (c) Cooperative binding of the substrate
   (d) Substrate binding sites and regulatory sites are different

4. Which of the following is protease inhibitor?
   (a) Di-isopropyl flurophosphate
   (b) Phenyl methanesulfonyl fluoride
   (c) N-4-toluenesulfonyl- L- phenylalanine chloromethyl ketone
   (d) All of the above

5. An example of competitive inhibition of an enzyme is the inhibition of
   (a) succinic dehydrogenase by malonic acid
   (b) cytochrome oxidase by cyanide
   (c) hexokinase by glucose-6-phosphate
   (d) carbonic anhydrase by carbon dioxide

6. Fractional precipitation of one enzyme requires addition of 2.5 to 3.5 mM salt. Which of the following salts would you choose?
   (a) silver chloride, AgCl
   (b) ammonium sulfate, (NH4)2SO4
   (c) ammonium perchlorate, NH4ClO4
   (d) guanidinium chloride, CN3H6Cl

7. The process by which a substrate binds to an active site and alters the shape of the active site is
   (a) induced fit hypothesis
   (b) allosteric enzyme modeling
   (c) enzyme engineering
   (d) none of the above

8. A non-protein, organic molecule covalently bound to the active site, required to catalyze a reaction is termed as
   (a) Cofactor
   (b) prosthetic group
   (c) apoenzyme
   (d) Coenzyme

(P.T.O.)

Q2. Answer any SEVEN of the following questions briefly: **(7 X 2 = 14 Marks)**

1. Differentiate between cofactor and coenzyme.
2. Differentiate between unit activity and specific activity.
3. Differentiate between monomeric and oligomeric enzymes.
4. Give examples of any four allosteric enzymes.
5. Give examples (names) of any two enzymes present in nucleus of a cell.
6. Why the enzymes have fragile structure?
7. Define Salting in and salting out of proteins.
8. What are ribozymes? Give example/s.
9. Give two examples of anion exchangers and two examples of cation exchangers used in ion exchange chromatography.

Q3. (a) Using a flowchart, explain the steps involved in purification of an enzyme and list principle separation methods used in purification of enzymes. (6)

(b) Explain any one method of homogenization of animal and plant tissue used for isolation of enzymes. (6)

OR

(b) Explain the specificity of enzymes by giving examples. (6)

Q4. (a) Derive MM equation for single substrate reaction and explain its significance. (6)

(b) Explain the kinetics of reversible enzyme inhibition. (6)

OR

(b) Derive an equation for non-competitive inhibition (6)

Q5. (a) Explain in detail the mechanism of action of chymotrypsin. (6)

(b) Explain kinetic behaviour and physiological importance of allosteric enzymes by giving suitable example/s. (6)

OR

(b) What is catalytic efficiency? Explain factors associated with the catalytic efficiency of an enzyme. (6)

Q.6 (a) Give examples and explain the regulatory enzymes that are activated by irreversible and reversible covalent modification of a specific functional group. (6)

(b) Explain Enzyme engineering and its applications. (6)

OR

(b) Give example and explain enzyme repression, induction and degradation for control. (6)