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SARDAR PATEL UNIVERSITY

M. Sc. THIRD SEMESTER INDISTRIAL BIOTECHNOLOGY EXAMINATION

TUESDAY, DATE: 04-12-2012

PS03CIBT03 ENZYMOLOGY

TIME: 2:30 to 5:30 pm **MAX. MARKS: 70**

Q-1 Select (tick'√') the correct answer from the following [08]

1. The term Kcat/Km is
   a. Efficiency constant
   b. Proficiency constant
   c. Specificity constant
   d. All of the above
2. In a substrate saturation curve in presence of a reversible enzyme inhibitor, if the x and y intercepts change, but the slope remains constant with the increase in inhibitor constant in LB plot, the type of inhibition is
   a. Competitive
   b. Non competitive
   c. Uncompetitive
   d. Mixed
3. Which of the following is false for MM kinetics?
   A. Km = ½ Vmax
   B. $V_0 = K_2 [E_0]$
   C. $V_{max} = K_2 [ES]$
   D. Km = [E] [S]/[ES]
   a. Only A is false
   b. B and C are false
   c. A B C are false
   d. All are true
4. EC 1.1.1.1 represents
   a. Alcohol dehydrogenase
   b. Invertase
   c. Chymotrypsin
   d. Lysozyme
5. Chymotrypsin is an example of
   a. Electrostatic catalysis
   b. Covalent catalysis
   c. Sigmoidal kinetics
   d. None
6. Fold purification is
   a. Test of homogeneity
   b. Number of times the enzyme concentration increases
   c. Number of times the unit activity increases
   d. Number of times specific activity increases

7. Protein engineering is predetermined alterations in protein by
   a. Addition or deletion of one amino acid
   b. Addition or deletion of more than one amino acids
   c. Deletion of protein domain
   d. All of the above
8. Ribozymes are
   a. Isozymes
   b. Oligomeric proteins
   c. RNA catalysts
   d. Catalytic antibodies

Q-2 Attempt: (Any Seven) [14]

a. Define turnover number
b. Explain principle of affinity chromatography
c. What is ping-pong mechanism?
d. What is covalent catalysis?
e. Write the Michaelis Menton assumption.
f. Draw Cornish-Bowden Eisenthal plot
g. Draw Arrhenius plot
h. Describe the hemoglobin structure
i. Write the Adair equation for a tetrameric enzyme.

Q. 3 a) Derive an equation for Mixed Inhibition (06)

b) Explain with the help of equation, the Dixon plot for Competitive inhibition (06)

OR

b) Explain how we differentiate between binary and ternary complex mechanisms in a two substrate reaction (06)

Q. 4 a) Explain with suitable examples how we study enzyme mechanisms. (06)

b) Explain the active site structure of chymotrypsin (06)

OR

b) Explain the oligomeric structure of ATCase (06)

Q. 5 a) Write a note on: MWC and KNF models (06)

b) "Allosteric enzymes follow sigmoidal kinetics", explain giving example (06)

OR

b) "ATCase follows MWC model", justify (06)

Q. 6 a) Analyze the given substrate saturation data for Invertase reaction by suitable plot to determine Km, Vmax and Kcat.

[S] mmol/ L	5.0	6.67	10	20	40
Velocity µmoles/L/min	147	182	233	323	400

Given: [E] = 0.05 mg/ml, Mol wt 55 kd. (06)

b) Explain Protein engineering giving suitable examples (06)

OR

b) "Hemoglobin is an excellent Oxygen carrier", Justify (06)

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