

SARDAR PATEL UNIVERSITY

M. Sc. THIRD SEMESTER BIOTECHNOLOGY EXAMINATION

TUESDAY, DATE: 04-12-2012

PS03CBIT03 ENZYMOLOGY

TIME: 2:30 to 5:30 pm

MAX. MARKS: 70

Q-1 Select (tick 'v') the correct answer from the following

[08]

1. The term K_{cat}/K_m 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. $K_m = \frac{1}{2} V_{max}$
 - B. $V_0 = K_2 [E_0]$
 - C. $V_{max} = K_2 [ES]$
 - D. $K_m = [E] [S]/[ES]$
 - 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
- Addition or deletion of one amino acid
 - Addition or deletion of more than one amino acids
 - Deletion of protein domain
 - All of the above
8. Ribozymes are
- Isozymes
 - Oligomeric proteins
 - RNA catalysts
 - Catalytic antibodies

Q-2 Attempt: (Any Seven)

[14]

- Define turnover number
- Explain principle of affinity chromatography
- What is ping-pong mechanism?
- What is covalent catalysis?
- Write the Michaelis Menton assumption.
- Draw Cornish-Bowden Eisenthal plot
- Draw Arrhenius plot
- Describe the hemoglobin structure
- 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 K_m , V_{max} and K_{cat} .
- | | | | | | |
|----------------------------------|-----|------|-----|-----|-----|
| [S] mmol/ L | 5.0 | 6.67 | 10 | 20 | 40 |
| Velocity $\mu\text{moles/L/min}$ | 147 | 182 | 233 | 323 | 400 |
- Given: $[E] = 0.05 \text{ mg/ml}$, Mol wt 55 kd. (06)
- b) Explain Protein engineering giving suitable examples (06)
- OR
- b) "Hemoglobin is an excellent Oxygen carrier", Justify (06)
