

SEAT No. \_\_\_\_\_

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[82/83/84/94]

M. Sc. THIRD SEMESTER

MICROBIOLOGY/ BIOTECHNOLOGY/BIOCHEMISTRY EXAMINATION

MONDAY, DATE: 04-01-2021

PS03CMIC/BIT/BIC23 ENZYMOLOGY

PS03CMIC/BIT/BIC03 ENZYMOLOGY

TIME: 2:00 to 4:00 pm

MAX. MARKS: 70

Q. 1 (A) Choose the correct answer

-(08)

- The active site of chymotrypsin consists of a catalytic triad of which of the following amino acid residues?
  - Serine, histidine and aspartate
  - Threonine, histidine and aspartate
  - Methionine, histidine and aspartate
  - Serine, histidine and glutamate
- Which of these techniques is used to check homogeneity of proteins?
  - IEF
  - SDS PAGE
  - N terminal analysis
  - all
- In MM kinetics when velocity is  $1/2V_{max}$  the substrate concentration is equal to  $K_m$ . What will be the substrate concentration at  $V_{max}$ ?
  - $1/2 K_m$
  - $2 K_m$
  - zero
  - infinite
- Glucokinase catalyses the transfer of phosphate from ATP to glucose and to no other sugar is called
  - Group Specificity
  - bond specificity
  - Absolute specificity
  - stereospificity
- When the  $V_{max}$  and slope change but the  $K_m$  remains unchanged in presence of a reversible inhibitor, the type of inhibition is
  - competitive
  - noncompetitive
  - uncompetitive
  - mixed
- The purity of an enzyme at various stages of purification is best measured by:
  - Total protein
  - Total enzyme activity
  - Specific activity of the enzyme
  - Percent recovery of protein
- For a single substrate enzyme catalysed reaction, if  $[S_0] = 0.5 K_m$  then What will be the value of  $V_0$ ?
  - $V_{max}$
  - $1/2 V_{max}$
  - $1/3 V_{max}$
  - $2/3 V_{max}$
- Under the effect of increasing temperature the rate of enzyme reaction
  - only increases
  - increases then decreases
  - only decreases
  - increases than remains constant

[1]

[P.T.O.]

**Q 1 (B) Do as Directed: (one mark each)**

**[16]**

1. In Chymotrypsin, Serine-195 acts as a nucleophile (T/F)
2. Enzyme-catalysed reactions do not involve a transition state. (T/F)
3. The LB plot for an irreversible inhibition looks like noncompetitive inhibition (T/F)
4. Enzyme increases the rate of reaction by lowering the activation energy (T/F)
5. Dixon plot is an example of Secondary plot (T/F)
6. If Enzyme A having lower  $K_m$  value than Enzyme B, then which enzyme exhibits higher affinity for substrate: \_\_\_\_\_
7. In the inactive T state of Aspartate transcarbamoylase, \_\_\_\_\_ binds to enzyme as allosteric modulator.
8. ATCase operates through \_\_\_\_\_ model
9. Enzyme efficiency is expressed by \_\_\_\_\_ value
10. Which plots are used to determine  $K_i$ ?
11. Carboxypeptidase A follows which type of enzyme binding mechanism?
12. Draw Hill's plot
13. Write Alberty's equation for ternary complex mechanism
14. Two substrates reactions involving binary complex is also called as \_\_\_\_\_ mechanism
15. Give one example of enzyme mechanism involving covalent catalysis.
16. The ES complex is a \_\_\_\_\_ (transition state/intermediate)

**Q-2 Attempt: (Any Seven)**

**[14]**

- a. Make a labelled sketch of ATCase enzyme
- b. Explain the terms  $K_{cat}$  and  $K_m$
- c. Draw a labelled Arrhenius plot.
- d. Define Unit activity and specific activity
- e. Define Ribozyme and enlist its types.
- f. What are abzyme?
- g. Draw a labelled LB plot
- h. How ordered sequential is differ from random sequential bisubstrate reaction?
- i. Draw a flow chart of enzyme purification strategy.

Q. 3 List the techniques used in enzyme purification and explain any two in detail **(08)**

OR

Q. 3 Enlist various factors affecting enzyme activity and describe any three in detail. **(08)**

Q. 4 Explain noncompetitive inhibition with the help of various plots and equations **(08)**

OR

Q. 4 Discuss the binary and tertiary complex mechanisms of two substrate reaction and explain how we differentiate them experimentally? **(08)**

Q. 5 Explain the mechanism of lysozyme action **(08)**

OR

Q. 5 Discuss the mechanism of chymotrypsin action **(08)**

Q. 6 What are isoenzymes? Explain their physiological significance **(08)**

OR

Q. 6 Write a note on: Enzyme engineering **(08)**

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[2]