SARDAR PATEL UNIVERSITY

B.Sc [Biochemistry] Examination, Vth Semester (NC)

Tuesday, Date: 10-04-2018

Time 2 p.m. to 5 p.m.

Subject /Course Code US 05 CBCH 02

Subject/Course Title: Enzymology

Max Marks : 70

Q.1 Choose the most correct answer and write in the answer sheet. (10 marks)

1. The enzyme catalyzed reactions attain equilibrium
   - (a) Faster
   - (b) Slower
   - (c) Never
   - (d) Sometimes

2. To check the purity of purified enzyme PAGE gels are usually stained with
   - (a) CBB reagent
   - (b) Seen under UV light
   - (c) Silver nitrate reagent
   - (d) None of the above

3. For which class of enzymatic reaction, $Mg+2$ are required as cofactor?
   - (a) Oxido-reductase
   - (b) Transferases
   - (c) Hydrolase
   - (d) Lyase

4. Which of the following effect could be due to change in pH on enzyme catalyzed reaction
   - (a) inactivation of enzyme at unoptimum pH
   - (b) change in ionization of active site contact amino acid sidechain
   - (c) change in ionization state of substrate
   - (d) all of the above

5. Which of the following model explain specificity of binding of substrate with enzyme
   - (a) KNF model
   - (b) Monod, Wyman and Changeu model
   - (c) MM equation
   - (d) Emil Fisher's lock and key model

6. Which of the following enzymes is the marker enzyme for mitochondrial fraction
   - (a) Cytochrome c oxidase
   - (b) DNA polymerase
   - (c) succinate dehydrogenase
   - (d) hexokinase

7. Which of the following method is used for purification of enzyme based on its solubility
   - (a) Centrifugation
   - (b) Isoelectric focusing
   - (c) Ultrafiltration
   - (d) Ammonium sulphate precipitation

8. For which of the following, the derivation of Km value is significant
   - (a) For determining affinity of enzyme for substrate
   - (b) to judge the role of enzyme in metabolism
   - (c) for characterizing the specificity of enzyme for a particular substrate
   - (d) for all of the above

9. Which of the following enzymes has low specificity, works at optimum pH between 9 and 10 and is useful in diagnosis of obstructive jaundice as well as osteomalacia
   - (a) Alkaline phosphatae
   - (b) Creatine kinase
   - (c) Acid phosphatase
   - (d) Lactate dehydrogenase

10. Which of the following enzymes is estimated to diagnose gout
    - (a) glucoseoxidase and peroxidase
    - (b) Arginase
    - (c) urate oxidase and peroxidase
    - (d) pyruvate kinase

(P.T.O.)

Q2. Answer any TEN of the following questions briefly: (20)

1. What is unit activity? How do we find unit activity of an enzyme?
2. What are coenzymes? Give any two examples of reactions with names of coenzymes used.
3. What are isoenzymes? How can we separate isoenzymes?
4. Differentiate between monomeric and oligomeric enzymes.
5. Define Km. What is the importance of deriving this constant?
6. What is the importance of deriving Kcat/Km?
7. Write the principle of electrophoresis technique useful for isolation of enzymes.
8. What are the applications of glucose oxidase enzyme?
9. Which was the first enzyme crystallized? By whom?
10. Give two examples of anion exchangers and two examples of cation exchangers used in ion exchange chromatography.
11. What are the advantages and disadvantages of L.B. plot?
12. Explain how enzymes lowers activation energy of a biochemical reaction?

Q3. (a) Explain the major properties of enzymes – catalytic activity, specificity and regulation. (5)
(b) Explain effect of pH on enzyme catalyzed activity. (5)

OR

(a) Why do we find unit activity of an enzyme? What is specific activity? Discuss importance of deriving specific activity over unit activity. (5)
(b) Explain the effect of temperature on enzyme catalyzed biochemical reactions. (5)

Q4. (a) Give examples of at least two enzymes located in the following cell organelle. (5)
　　　(i) Cytoplasm (ii) Mitochondria　(iii) Cell membrane　(iv) Lysosomes　(v) Nucleus
(b) Suggest a suitable technique for each of the following tasks in purification of enzymes. (5)
　　　i. to confirm purity of an isolated enzyme
　　　ii. to find/confirm molecular weight of an isolated enzyme
　　　iii. to separate isoenzymes
　　　iv. to find number of subunits in an enzyme
　　　v. Large scale purification based on size or mass of an enzyme

OR

(a) List various methods for enzyme isolation based on possession of specific binding sites or structural features and give the principle of any one method. (5)
(b) Explain any one method of enzyme purification based on charge on it. (5)

Q.5 (a) Give details of any two plots useful to derive the Km value. (5)
(b) Derive Michaelis-Menten equation for one substrate reaction based on equilibrium assumption for the reaction E+S $\leftrightarrow$ ES (5)

OR

(a) What are allosteric enzymes? Explain the main features of allosteric enzymes. (5)
(b) Explain competitive inhibition of enzymes using examples. (5)

Q.6 (a) Write a note on determination of enzyme activities for clinical diagnosis. (5)
(b) Explain the applications of enzyme therapy (5)

OR

(a) What are the advantages of enzyme immobilization? (5)
(b) Give examples and explain clinical applications of enzymes. (5)

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