

SARDAR PATEL UNIVERSITY  
B.Sc.(5<sup>th</sup> Semester) EXAMINATION 2013  
Monday, November 18<sup>th</sup>, 2013  
10:30 p.m. TO 1:30 p.m.  
SUBJECT: MICROBIOLOGY US05CMIC03  
(Microbial Physiology and Enzymology)

TOTAL MARKS: 70

Note: (1) All the questions are compulsory.  
(2) Figures on the right indicate marks.

**Q-1 Select the correct answer for each question from the option given below [10]**

1. **The sodium-potassium pump is an example of \_\_\_\_\_.**  
(A) Endocytosis (B) Pinocytosis (C) Passive transport (D) Active transport
2. **What is the function of non-polar part of cytoplasmic membrane?**  
(A) It does not have a non-polar part.  
(B) It prevents extracellular fluid from leaving the cell and intracellular fluid from entering the cell.  
(C) It is hydrophobic and extracellular fluid from entering the cell and intracellular fluid from leaving the cell.  
(D) It is to position the organelles within the cell.
3. **Which of the following antibiotic does not belong to the class of penicillin?**  
(A) Ampicillin (B) Methicillin (C) Phenethyllicin (D) Vancomycin
4. **Which of the following antibiotic binds to 30S subunit of ribosome and inhibits protein synthesis?**  
(A) Bacitracin (B) Chloramphenicol (C) Streptomycin (D) Polyxin
5. **Those enzymes which catalyze same reaction but having different properties are known as \_\_\_\_\_.**  
(A) Apoenzyme (B) Isoenzyme (C) Zymogen (D) Coenzyme
6. **Those enzymes which are involved in the transfer of electrons are categorized in to which of the following class?**  
(A) Ligase (B) Transferase (C) Oxidoreductase (D) Isomerase
7. **Which of the following vitamin is required as a coenzyme for the oxidation-reduction reactions?**  
(A) Biotin (B) Riboflavin (C) Pyridoxine (D) Thiamine
8. **In which of the following type of reversible inhibition  $K_m$  of enzyme remains unaltered and  $V_{max}$  decreases?**  
(A) Competitive (B) Uncompetitive (C) Noncompetitive (D) Mixed
9. **Which kinetic parameter can be determined from the intercept on Y-axis of Double reciprocal plot?**  
(A)  $K_m$  (B)  $V_{max}$  (C)  $K_i$  (D)  $K_s$
10. **Which of the following covalent modification leads to activation of glycogen phosphorylase?**  
(A) Acetylation (B) Adenylation (C) Perfluoroacylation (D) Phosphorylation

- Q-2 Give Short answers to following questions (Any ten) [20]**
- [1] Enlist various factors affecting the rate of diffusion
  - [2] What are the principle features of fluid mosaic model?
  - [3] Define (1) Porins (2) Fick's law
  - [4] Why dehydration of the protoplast is an important factor in the ability of endospores to resist environmental stress? Justify
  - [5] Write about the mode of action of streptomycin in brief.
  - [6] Define (1) Chemotaxis (2) Run and Tumble
  - [7] What are zymogens? Define with suitable example.
  - [8] Define (1) Active Site (2) Temperature coefficient  $Q_{10}$
  - [9] List any four properties of enzymes.
  - [10] Justify-  $K_m$  is that substrate concentration at which initial velocity ( $V_o$ ) is half of the maximum velocity ( $V_{max}$ )
  - [11] What is random bi bi mechanism of bisubstrate reaction? Explain diagrammatically by Cleland short hand notation.
  - [12] Derive Line Weaver Burk equation and draw its plot.

- Q-3 (A) Write a note on- Active transport [05]**  
**(B) Write a brief note on-Group translocation [05]**

**OR**

- Q-3 Explain in detail about siderophores and enlist their applications. [10]**

- Q-4 (A) Discuss the mode of action of following chemotherapeutic agent [06]**  
**(1) Penicillin (2) Zidovudine (3) Sulphonamides**  
**(B) Explain germination of endospores. [04]**

**OR**

- Q-4 Define Chemotherapy? Enlist the principle, criteria, and general mode of action for a substance to be a chemotherapeutic agent and discuss the mechanism of resistance for penicillin and streptomycin. [10]**

- Q-5 Enlist and discuss influence of different factors affecting enzyme activity. [10]**

**OR**

- Q-5 Enlist the strategies to purify the enzymes and discuss in detail purification of UMP synthase. [10]**

- Q-6 (A) Write a note on- Salient features of Allosteric enzymes [04]**  
**(B) Write a note on- Reversible inhibition of enzymes. [06]**

**OR**

- Q-6 Derive the relationship between initial velocity ( $v_o$ ), maximum velocity ( $V_{max}$ ) and substrate concentration  $[S]$  using different assumptions. [10]**

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