RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR [2014-17]

B.A./B.Sc. THIRD SEMESTER (July – December) 2015

Mid-Semester Examination, September 2015

Date : 14/09/2015 **MICROBIOLOGY (Honours)**

Time : 11 am – 1 pm Paper : III Full Marks : 50

1. a) Given the reaction $E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \xrightarrow{k_P} E + P$ where $k_1 = 1\times10^7 M^{-1} sec^{-1}$, $k_{-1} = 1\times10^2 sec^{-1}$, $k_P = 3\times10^2 sec^{-1}$. Calculate : (i) K_S (ii) K_m (iii) Can K_P be greater than K_1? [2+2+3]

   b) Plot the velocity versus time graph of a monosubstrate enzymatic reaction where, (i) [S] >> [E] (ii) [S] < [E] (iii) [S] = [E] [1+1+1]

2. Answer **any four** questions : [4×3]
   a) State the characteristic features and functions of –10, –35 and UP elements of promoter DNA in relation to initiation of transcription.
   b) How does Actinomycin D kill bacteria? State the role of Nus A protein in transcription.
   c) State the roles of 5´– and 3´ UTR in gene functioning. What is a spliceosome?
   d) How can you prove that transcription occurs in $5' \rightarrow 3'$ direction?
   e) How did Nirenberg and coworkers prove the triplet nature of genetic code by triplet-binding assay?

3. a) How would you chemically sanitize air? [2]
   b) What are the different types of bioaerosol? [3]
   c) What is substrate defined test for coliform? [3]

4. State with examples the distinguishing features of secondary active transport as opposed to primary active transport. Write a very brief account on ion channels. [2+3]

5. a) Define endocytosis. Briefly describe the different components of an endocytic pathway. [1+3]
   b) What are coated pits? Write a short description of 'clathrin-mediated endocytosis'. [1+2]

6. a) Coenzymes are considered as a special class of substrate — Justify the statement. [2]
   b) Does Km vary with substrate concentration? [2]
   c) What are monomeric and multimeric enzymes? Give examples. [2]
   d) How would you determine whether the enzyme is inhibited by competitive inhibitor or non-competitive inhibitor? [2]

——— × ———