

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR

B.A./B.SC. THIRD SEMESTER (July – December), 2011

Mid-Semester Examination, September, 2011

Date : 12/09/2011

MICROBIOLOGY (Honours)

Time : 2 pm – 4 pm

Paper : III

Full Marks : 50

Group – A

Answer any three questions from Q.No. 1-4. Question no. 5 & 6 are compulsory :

1. a) How can you prove that the replication in *E.coli* is bidirectional?
b) Write down the mechanistic difference in the action of Topoisomerase I and Topoisomerase II.
c) What is nick translation? [3+2+1]
 2. a) Briefly describe the role of σ factor in Transcription.
b) Write down the action of Rifampicin on transcription.
c) What is meant by down mutation? [3+2+1]
 3. a) Briefly describe the structure of tRNA.
b) How does the wobble base of the anticodon determine the number of codons a tRNA can recognize? [3+3]
 4. a) Why many point mutations are phenotypically silent?
b) How in *E.coli*, a new set of genes are active when the temperature is raised abruptly?
c) What is a concatemer? [3+2+1]
 5. a) Deduce the equation for competitive Inhibition of a single substrate enzymatic reaction.
b) What fraction of V_{max} is observed at— i) $[S] = 5 K_m$
ii) $[S] = 10 K_m$
c) Calculate the ratios of $[S]_{0.9} / [S]_{0.5}$ and $[S]_{0.75} / [S]_{0.5}$ for Briggs-Haldane equation of enzyme. [5+2+3]
- Or,**
- a) Deduce the Michaelis-Menten equation of single substrate enzyme catalyzed reaction.
 - b) Deduce the Briggs-Haldane modification of the aforesaid Michaelis-Menten equation.
 - c) For the equation, $E + S \xrightleftharpoons[K_{-1}]{K_1} ES \xrightarrow{K_p} E + P$ if $k_1 = 1 \times 10^7 \text{ M}^{-1}\text{sec}^{-1}$, $k_{-1} = 1 \times 10^2 \text{ sec}^{-1}$ and $k_p = 3 \times 10^2 \text{ sec}^{-1}$ calculate, i) K_s (ii) K_m (iii) can K_p be very much greater than k_1 ? [3+3+4]
6. a) How can K_i be determined for competitive Inhibition?
b) Initially describe how enzyme can be classified.
c) Mention the drawbacks of $\frac{1}{v}$ and $\frac{1}{[S]}$ in enzyme plots. [2+2+1]

Group – B

Answer the following questions :

7. a) Air does not contain normal flora —Justify.
b) Name two moulds present in air.
c) What is aerosol? Write down the features of different types of aerosol?
d) How would you sanitize room air with the help of chemical sanitizers? [2+2+(1+3)+2]
8. a) What are white cell ghost and red cell ghost?
b) Define facilitated diffusion with proper example.
c) Briefly explain the transport of Na^+ and K^+ ion through $\text{Na}^+ - \text{K}^+$ At Pase. [2+2+3]