

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

SECOND YEAR [2015-18]

B.A./B.Sc. THIRD SEMESTER (July – December) 2016

Mid-Semester Examination, September 2016

Date : 10/09/2016

MICROBIOLOGY (Honours)

Time : 11 am – 1 pm

Paper : III

Full Marks : 50

1. a) What will happen if puromycin is added to a growing bacterial culture? [3]
b) How does a double-sieve mechanism increase the fidelity of translation. [3]
c) What is Wobble hypothesis of Crick? [2]
d) What will happen in respect of sigma factor synthesis if the environment of a growing *E.coli* culture is too much adverse? [2]
 2. a) What is bioaerosol? Write a note on their types. [2+2]
b) What are the characteristics of an ideal indicator bacteria for microbiological quality of water? [3]
 3. a) What is cell signaling? Mention its importance. [1+1]
b) What are various types of cell signaling? Explain with one example. [3]
c) How do cells recognize signals? [2]
- Or,**
- a) What do you mean by second messengers? Give example. [2]
b) How do cell signals affect cell function? [3]
c) Briefly explain the role of nitric oxide as signalling molecule. [2]
 4. a) If the hydrophobic interior of a biological membrane were about 3 nm thick, what would be the minimum number of amino acids in a stretch of transmembrane α helix? [2]
b) What are ionophores? Give examples. [2]
c) Phospholipids are amphipathic molecules. Show how this property accounts for the impermeability of biological membranes to polar compounds and ions. [2]
 5. a) Define “endocytosis” and “exocytosis”. [2]
b) Write a short note on “clathrin mediated endocytosis”. Explain with a proper diagram. [3]
 6. a) What do you mean by Activity and Specific Activity of an enzyme? [1.5+1.5]
b) One microgram of pure enzyme (MW = 92,000) catalyzed a reaction at a rate of 0.50 micromoles/minute under optimum conditions. Calculate—
i) Specific activity of the enzyme in terms of units/mg protein and units/mole. [1+1]
ii) The Turnover Number [2]
iii) The time of one catalytic cycle [1]
c) What is the significance of K_m ? [3]
d) i) What fraction of V_{max} is observed at $[S] = 4 K_m$ and $[S] = 6 K_m$? [1+1]
ii) Calculate the ratio of $\frac{[S]_{0.9}}{[S]_{0.5}}$ and $\frac{[S]_{0.75}}{[S]_{0.5}}$. [1+1]

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