RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

SECOND YEAR [2018-21]

B.A./B.Sc. THIRD SEMESTER (July – December) 2019

Mid-Semester Examination, September 2019

Date : 16/09/2019

Time : 1 pm – 3 pm

MICROBIOLOGY (Honours)

Paper : III

Full Marks : 50

1. a) How can 31 types of tRNA can read all the 61 sense codons during translation? (3)

   b) What is meant by " Open Reading Frame "(ORF)? How many ORF is possible in an mRNA? (1.5+1.5)

   c) How can you prove that regulator gene exhibits trans-dominance but cis-dominance in case of operator locus? (2+2)

   d) Why is lac operon said to be both negatively and positively regulated? (2)

2. a) Write down the catalytic mechanism of RNA polymerase. (2.5)

   b) What is abortive initiation? Explain the fact with respect to the scrunching model. (2.5)

   c) What do you mean by rho independent termination process? (2.5)

   d) How sigma factor does mediate the binding of RNA polymerase to the promoter? (2.5)

3. a) What is paracrine signalling? Give an example to explain paracrine signalling pathway. (1+1)

   b) Explain the role of second messengers in cell signalling. Give the major classes of second messengers. (2+1)

4. The following set of data was recorded in a monosubstrate enzyme catalysed reaction :

[S] (M)	v (nmoles x litre^{-1}x min^{-1})
6.25 x 10^{-6}	15
7.50 x 10^{-5}	56.25
1.00 x 10^{-4}	60
1.00 x 10^{-3}	74.9
1.00 x 10^{-2}	75

   a) Estimate V_{max} and K_m. (2)

   b) What would be the "v" at [S] = 2.5 x 10^{-5} M and at [S] = 5 x 10^{-5} M. (2)

   c) What would be the "v" at [S] = 5 x 10^{-5} M if the enzyme concentration were doubled. (3)

   d) The "v" given in the above table was determined by measuring the concentration of product that has accumulated over a 10-minute period. Verify that "v" represent a true initial/instantaneous velocity. (3)

5. a) What is the difference between littoral and limnetic zone? (2)

b) What are the contributions of Martinus Willem Beijerinck ? (2)

c) What is the selective agent in EMB agar? (1)

6. a) Explain the terms partition, permeability and diffusion. Deduce a relationship among the coefficients of the above three terms. (2+2)

b) Cite two each examples of primary active transport and secondary active transport systems present in *E. coli* membranes. (2)

c) Compare and contrast valinomycin and gramicidin in terms of their functions as ionophore. (2)

———— × ————