

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2018-21]

B.A./B.Sc. FIRST SEMESTER (July – December) 2018

Mid-Semester Examination, September 2018

Date : 24/09/2018

MICROBIOLOGY (Honours)

Time : 11 am – 1 pm

Paper : I

Full Marks : 50

1. a) Define polyprotic acids. Explain with example. [2]
b) What are the (i) H^+ ion concentration, (ii) pH (iii) OH^- ion concentration of a 0.001 M solution of HCl ? [3]
2. a) Write down the structures of and label the following:-
(i) cGMP (ii) TC dinucleotide [1×2]
b) Underwound DNA has negative supercoiling in it — Justify. [3]
3. a) Write down three important differences between gram positive and gram negative cell wall. [3]
b) How does bacterial capsule impart virulence ? [3]
4. Calculate median and mode from the following distribution. [5]

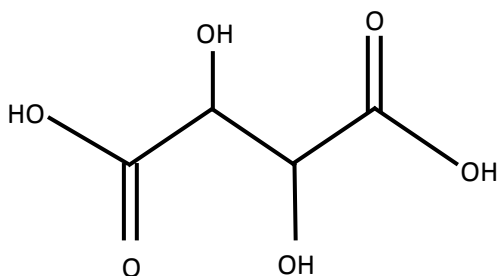
Class Interval	60-65	66-70	71-75	76-80	81-85
Frequency	12	25	45	30	8

5. a) What is the G + C content of DNA? How can it be determined through melting temperature studies? [1+2]
b) Define type strain. [1.5]
c) With what three major criteria did Whittaker divide organisms into five kingdoms? [1.5]
6. a) Write two exception of Koch's postulates. [2]
b) What is meant by Pasteurization ? [2]
c) The prokaryotic genomic DNA is negatively supercoiled-Why? [2]

Answer any one of the following :

[1×5]

7. a) Tartaric acid is represented by the bondline formula as depicted below



Draw all possible stereoisomers of tartaric acid in the Fisher projection formula. Comment on their optical activity based on symmetry elements. How would you classify them as per the D/L-nomenclature scheme? What would be their configurational descriptors in the IUPAC system? [2+1+1+1]

- b) Aldohexoses mostly exist in the D-configuration and amino acids exist in the L-configuration in nature. Using this information draw the Fisher projection formula of glucose and the flying wedge conformation of alanine. Is naturally occurring alanine in the R or S- configuration?

Classify. Can alkynes exhibit geometrical isomerism across the triple bond? Rationalize your answer. [1+1+1+2]

8. a) What are the methods that are being used to determine protein structure? [3]
 b) Peptide bonds in protein have some characteristic feature – state and explain three such features. [3]
9. a) What do you mean by isoelectric pH of an amino acid? Name one basic amino acid. [2]
 b) What is meant by retention time of a size exclusion column while separating proteins from a heterogeneous mixture? [2]
 c) How ninhydrin reagent can be used for amino acid analysis of proteins? [2]

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