

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

FIRST YEAR [2018-21]

B.A. /B.Sc. SECOND SEMESTER (January – June) 2019

Mid-Semester Examination, March 2019

Date : 25/03/2019

MICROBIOLOGY (Honours)

Time : 11am – 1pm

Paper: II

Full Marks: 50

Answer the following questions:

1. a) What do you mean by RM value of a fat or oil?
b) Polar bears of the arctic can withstand subzero temperatures while humans there can freeze to death without protective clothing — Justify. [3+3]
2. a) Explain the role of radioisotopes in medical diagnosis.
b) C^{14} has a half life of 5700 years. Calculate the fraction of the C^{14} atoms that decays – (i) per year (ii) per minute. [3+(1+1)]
3. a) State three arguments for the consideration of a double helical form of DNA.
b) State the structural and functional peculiarities of telomerase enzyme meant for the replication of telomeric DNA. [3+3]
4. a) "Lysosomes are an animal cell's digestive organelles" — Explain.
b) Mitochondria are sometimes described as "cellular power houses" — Why? [2+2]
5. In a cross between black and white coat coloured mice, the F_2 individual segregated into 787 black and 277 white coat coloured individuals. If you have to test that these results agree with the expected ratio 3:1, then apply chi-square $P = 5\%$, $df = 3.84$. [5]
6. Compare dialysis and ultrafiltration. Explain fluorescence and phosphorescence with the help of Jablonski diagram. State the working principle for ion exchange chromatography. [1.5+2+1.5]
7. How does annulus differ from desmotubule? What is the function of catenin? What is tropocollagen? [2+1+2]
8. a) Both mannose and galactose are epimers of glucose. Justify or criticize the statement.
b) Lactose is a reducing sugar but Sucrose is non-reducing sugar. What can you conclude about the structures of Lactose and Sucrose from this? How can you make sucrose behave as a reducing sugar and what is the name given to this phenomenon? [2+3]
9. a) Write a brief account of endosymbiosis.
b) Membrane proteins and lipids are asymmetrically oriented — elaborate with examples.
c) Name the three classes of lipids present in biomembranes. [2+2+1]
10. a) How do microorganism adapt to hypotonic and hypertonic environment?
b) What is plasmolysis? [1.5+1.5+1]

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