

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

FIRST YEAR

B.A./B.Sc. SECOND SEMESTER (January – June) 2015

Mid-Semester Examination, March 2015

Date : 18/03/2015

MICROBIOLOGY (Honours)

Time : 11 am – 1 pm

Paper : II

Full Marks : 50

1. a) Why did nature select DNA to be double-stranded? [2]
b) How was it proved that RNA is the genetic material of TMV? [3]
c) The superhelical density of a covalently closed circular DNA of 2100 bp long is -0.04 . What is the linking number of this DNA? (number of base pair/turn -10.5) [2]
2. a) How will you convert glucose to fructose. [2]
b) Glucose and mannose give the same Osazone. —Justify the statement. [2]
c) What happen when ribose is treated with HCl. [2]
d) What are reducing and non reducing sugar? Give examples. [2]
e) How will you convert glucose to glucouronic acid? [2]
3. a) What a short note on “artificial radioactivity”. [2]
b) Briefly explain the use of radioisotopes in metabolic studies. [3]
c) C^{14} has half life of 5700 years. Calculate the fraction of the C^{14} atoms that decays—
i) per year, ii) per minute [2]
4. a) Define the following with example— [3×2]
i) Photolithotroph
ii) Chemolithotroph
iii) Mixotroph
b) Define growth factor. [2]
c) What is reverse electron flow? [2]
5. a) Calculate the correlation coefficient between X and Y from the following data [4]

X	5	9	13	17	21
Y	12	20	25	33	35

b) Find the correlation coefficient in the followings, $byx = 0.4$ and $bxy = 0.9$. [1]
6. a) The UV spectrum of acetone shows two peaks of $\lambda_{max} = 280$ nm, $\epsilon_{max} = 15$ and $\lambda_{max} = 190$ nm, $\epsilon_{max} = 100$. [3]
i) Identify the electronic transition for each.
ii) Which is more intense?
b) A solution at a concentration of 32 $\mu\text{g/ml}$ of a substance having a molecular weight of 423 has an absorbance of 0.27 at 540 nm measured in a cuvette with a 1 cm length path. What is the molar absorption coefficient at 540 nm? Assume that Beer's law is obeyed. [3]
7. a) A solution containing a mixture of Glycerol monooleate, Alanine Hydrochloride and Cellulose is present in a beaker. How do you separate the lipid from the other two molecules? [2]
b) Write down the structure and IUPAC names of the following molecules— [3×1]
i) Sphingosine
ii) Phosphatidyl inositol
iii) α – Linolenic acid