

2015

M.Sc.

1st Semester Examination

MICROBIOLOGY

PAPER—MCB-103

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer any two questions from each group.

Group—A

[Marks : 20]

Answer any two questions.

1. Name one solvent whose boiling point is higher than water? What is the bonding orbitals of oxygen in water molecule? What do you mean by bond-dissociation energy? What do you mean by Zeroth law of thermodynamics? Justify how CO₂ is non-polar where as NH₃ is polar? 1+1+2+2+4

(Turn Over)

2. (a) Why do plants store starch as a fuel source rather than glucose ?
- (b) What is the conc of pure water at 25°C ? What do the mean by ion product of water ? What is the conc of H⁺ in a solution of 0.1 M NaOH ?
- (c) What do you mean by half life of isotope ?
- 3+(1+2+1)+3

3. Write short notes on the following (any four) : $4 \times 2 \frac{1}{2}$
- (a) Weak Acids and their conjugate bases.
- (b) Dissociation constant (K_a).
- (c) Donnan membrane equilibrium.
- (d) Effect of radiation on biological system.
- (e) Van-der. Waal's radii.
- (f) Antiport.

Group—B

[Marks : 20]

Answer any *two* questions.

1. (a) Define Beer — Lambert's law. 2
- (b) Define Bathochromic and Hypsochromic shift. 3
- (c) "A conjugated diene absorbs at a higher wavelength with higher value of extinction Coefficient as compared to a diene in which double bonds are isolated" —comment on this statement. 2
- (d) What is chromatin immunoprecipitation (ChIP) technique? 2
- (e) Why PABA (p-aminobenzoic acid) is generally used in many sunscren lotion? 1
2. (a) Which radiation, infrared or ultraviolet has shorter wavelength and lower energy? 1
- (b) Which out of benzene (colourless) or quinone (yellow) has mere easily promoted electrons? 1
- (c) Deduce the relation between stretching vibrational frequency of a bond with wave number. 2

- (d) Calculate the wave number of stretching vibration of a carbon - carbon double bond. Give force constant ($K = 10 \times 10^5$ dynes cm^{-1}). 2
- (e) Describe the principle application of FTIR, Raman, and CD spectroscopy in modern biological sciences. 3
- (f) Which microscope is more suitable to characterize the topographic view of a sample? 1
3. (a) Explain the mechanism of Electrophoresis. 2
- (b) Describe the advantage of MALDI-TOF-MS in high through put proteomic technology.
- (c) Write down on sample holder used in UV-Visible Spectrophotometry.
- (d) Write the type of ionization mode used in GC-MS. How you will select the most suitable one.
- (e) What is the difference between HPLC & GC.
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