

2010

M.Sc.

1st Semester Examination

MICROBIOLOGY

PAPER—III (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.

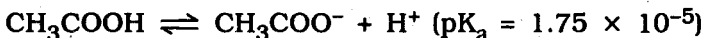
Answer any *two* questions from each group.

Group—A

[Marks : 20]

Answer any *two* questions.

1. (a) Write down the nuclear reaction for negatron emission. 2
- (b) State how you determine the age of a fossil using tracer technique. 4
- (c) Briefly describe the operating principle of liquid scintillation counter. 4
2. (a) What do you mean by Gibbs free energy and standard free energy change? 2+2
- (b) Calculate the standard state ΔG° values at (i) pH 0 and (ii) pH 5 for the dissociation of acetic acid : 3+3



Or

(Turn Over)

- (a) What do you mean by OS mode? 1
 (b) Describe how that molecular weight of a solute is determined from the osmotic pressure. 4
 (c) Write down the biological application of Gibbs-Donnan effect. 5
3. (a) What do you mean by activity co-efficient? 2
 (b) If $\text{pH} = -\log [\text{H}^+]$ for dilute solution, explain why the pH of 10^{-7}M HCl aqueous solution is less than 7. 8

Group—B

[Marks : 20]

Answer any two questions.

4. Write short notes on (any four) : $4 \times 2 \frac{1}{2}$
 (a) Gel Electrophoresis ;
 (b) Preparative Ultracentrifuge ;
 (c) Affinity Chromatography ;
 (d) Confocal Microscope ;
 (e) Visible spectroscopy.
5. (a) Draw schematic diagram of a mass spectrometer and explain its principle of operation.
 (b) Write in brief on Protein Crystallography. 6+4
6. (a) When does Nuclear Magnetic Resonance occur? Explain the working of NMR spectrometer with a schematic diagram.
 (b) Write on applications of Electron Microscope in Biological Sciences. 6+4