PC 1203-MH

AS/2058
PHYSICAL CHEMISTRY—III
(Common for B.Sc. Bio Tech. Sem. II)
Semester-II

Time Allowed : Three Hours]   [Maximum Marks : 26

Note : The candidates are required to attempt *five* questions selecting **two** questions from each of Sections A and B, Section C being compulsory.

SECTION-A

1. (a) What are colligative properties ? How lowering of vapour pressure is used in the calculation of molecular mass of solutes ?   2

    (b) When 1.8 g of a non-volatile solute is dissolved in 25 g of acetone, the solution boils at 56.86°C while pure acetone boils at 56.36°C under same atmospheric pressure. Calculate molecular mass of the compound. The molal elevation constant for acetone is 1.72°K kgmol^{-1}.   2

2. (a) Define ideal and non-ideal solutions. Prove that for an ideal solution $\Delta V_{mix} = 0$ and $\Delta H_{mix} = 0$.   2

    (b) What is Van't Hoff factor ? How is it used for the determination of degree of dissociation of a solute in the solution ?   2

3. (a) What do you mean by CMC ? Explain it.   2

    (b) What is an emulsion ? How is it prepared ? What are different types of emulsions? Give one example of each.   2

4. (a) Write a short note on 'Tyndall Effect'.
   (b) What is coagulation ? Explain Hardy-Schulze rule. 2

SECTION-B

5. (a) Derive Arrhenius equation.   2
   (b) The half life of a reaction at a particular concentration is 50 min. When the concentration is doubled, the half life becomes 100 min. Find out the order of the reaction.   2
6. (a) Briefly describe collision theory for unimolecular reactions.   2
   (b) The first order rate constant for the decomposition of N_2O_5 at 0°C is 7.87 x 10^{-7} min^{-1}. If the energy of activation is 24,700 $calmol^{-1}$, calculate its rate constant at 25°C.   2
7. Derive Michaelis-Menten equation.   4
8. (a) What are catalytic promoters and inhibitors ? Give suitable examples. How do they work ?   2
   (b) What is homogeneous catalysis ? Briefly describe its mechanism with suitable example.   2

SECTION-C

9. (a) Explain Brownian movement. What is its cause ?
   (b) State Raoult's Law. Explain it briefly.
   (c) Differentiate between order and molecularity.
   (d) Write a note on Dialysis.
   (e) What are gels ? How are they prepared ? Give their classification.

                                                    2x5=10