# PHYSICAL CHEMISTRY - III

### (Common with B.Sc. Bio. Tech.)

Time : Three Hours]           [Maximum Marks : 26

Note : Attempt *two* questions each from Section A and B, and the entire Section C.

### Section - A

1. What do you mean by depression in freezing point ? Derive thermodynamically the relation between molecular weight of solute and depression in freezing point.    4

2. (a) State and explain Raoult's law for solution containing non-volatile solute.    2
   (b) Calculate the osmotic pressure of 200 mL of solution containing 70 g of urea at 20°C. Given R = 0.0821 atm $LK^{-1}$ $mol^{-1}$.    2

3. State and explain Hardy-Schulze Rule. What is Flocculation value?    4

4. (a) Differentiate between Lyophillic and Lyophobic colloids.    2
   (b) Describe briefly the cleaning action of soap.    2

### Section - B

5. (a) What are the factors on which the rte of a reaction depends?    2
   (b) A reaction of first order with respect to A has a rate constant of 0.062 $min^{-1}$. If we start with [A] = 0.5 mol/L, when would [A] reach the value of 0.05 mol/L ?    2

6. Define Energy of activation. From Arrhenius equation how can we dervie an expression for the

determination of activation energy ?                                                                                    4

7.  (a)  What are Pseduo first order reactions ? Give *two* examples.
    (b)  Discuss the points of difference between Molecularity and Order of a reaction.        2

8.  Derive Michaelis-Menton equation for enzyme catalysed reaction.4

## Section - C

9.  Attempt all the following :
    (a)  Name *four* colligative properties.
    (b)  What are Emulsion ? Give *two* examples.
    (c)  What are the units of rate constant of zero order and second order reaction ?
    (d)  Define Temperature coefficient. What is the value of temperature coefficient for most of the reactions ?
    (e)  Define Homogenous catalysis. Give example.                                    $(2 \times 5 = 10)$