AS-2051
PHYSICAL CHEMISTRY-VI C
SEMESTER –II (SYLLABUS –MAY/19)

TIME :3 HOURS **M:M: 26**

NOTE : The candidates are required to attempt two questions each from Section A and B Section C will be compulsory .

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Section-A

1. Discuss two types of deviations exhibited by non-ideal solutions with examples. **(4)**

2. (a) What are the reasons for abnormal molecular masses of substances?

   (b) Why is the elevation in boiling point of NaCl solution double than that of a glucose solution of the same concentration?

   (2+2)

3. What are emulsions? Discuss the methods used in finding the type of an emulsion. How are emulsions prepared? **(4)**

4. Discuss the various types of Colloids based upon the nature of dispersed phase particle.

   (4)

Section-B

5. Consider the following mechanism for an enzyme catalysis:

$$E + S \underset{k_{-1}}{\overset{k_1}{\rightleftharpoons}} ES \underset{k_{-2}}{\overset{k_2}{\rightleftharpoons}} E + P$$

   Where E stands for enzyme, ES stands for enzyme-substrate complex and P for product. Applying steady state approximation for [ES], derive the rate law for the formation of the product during the initial stages. Discuss the rate when $K_m >>> [S]$ and $K_m <<< [S]$.

CONTI-2

(4)

6. The rate constant for the first-order decomposition of ethylene oxide into CH_4 and CO follows the equation: $\log k$ (in s^{-1}) = 14.34 - (1.25×10^4 K)/T. Calculate
   a. The activation energy of the reaction
   b. The rate constant at 700K and
   c. Frequency factor, A.

(4)

7. Explain various methods for determining the order of a reaction.

(4)

8. The $t_{1/2}$ of a reaction is halved as the initial concentration of the reactant is doubled. What is the order of the reaction?

(4)

Section-C

9. (i) State Henry's law.

   (ii) What do you mean by Gold number and what is its significance?

   (iii) Explain briefly acid-bases catalysis.

   (iv) Describe pseudo-first order reactions.

   (v) What are the units of the rate constants for zeroth order and half-order?

(5 X2 =10)

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