[Time: - 3 Hours] **[Marks : 70]**

Please check whether you have got the right question paper

N.B. (1) All questions are compulsory
(2) Figures to the right indicate full marks
(3) Draw neat labelled diagrams wherever necessary

1. a. Calculate the hydroxyl ion concentration of a solution having pH 3.5 (pKw = 14) **2**
   b. Explain Henry's law in detail. **3**
   c. Define i) half-life ii) order of reaction and derive equation for half-life of first order reaction. **3**
   d. Discuss the concept of spreading of liquids. **3**
   e. Write a brief note on oxidation reduction indicators **2**
   f. Differentiate between lyophobic and lyophilic colloids. **2**

2. a. Define buffers. Write a note on biological buffers. **4**

OR

Enlist methods to determine isotonicity and explain any one method in detail.

   b. What is Phase rule? Explain a two component system. **4**
   c. What are pseudo first order reaction? Derive an equation for reaction rate constant of first order reaction. **3**

3. a. Define Partition coefficient and give its applications. **4**
   b. Explain the relation of temperature with rate of reaction. **4**

OR

What are the different methods to determine order of reaction? Explain any two methods.

   c. Explain Langmuir Adsorption isotherm. **3**

4. a. Explain Sorensen's pH scale and derive equation for acidic buffers. **4**
   b. Classify different types of electrodes and explain Calomel electrode. **3**
   c. Discuss methods of preparation of lyophobic colloids. **4**

OR

Write a note on Kinetic properties of colloids.

5. a. Write a note on collision theory **3**
   b. i) Define wetting and contact angle **2**
   ii) Differentiate between Physical and Chemical adsorption **2**
   c. Explain 'Gold Number' and 'Schultz Hardy Rule' **4**

OR

Write a note on Protective Colloids

6. a. The half-life of first order reaction is 25 minutes. What will be the concentration of the reactant remaining after 70 minutes. **3**

   b. Define Interfacial tension and explain Capillary rise method. **4**
   c. State Nernst equation and write a note on ion sensitive electrodes **4**

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