

- Q.1 (a) If 5% of an acid dissociates into ions, what is the fraction of acid unionized? (2)
- (b) State Henry's Law of solubility of gases in liquids and discuss the factors affecting the solubility. (3)
- (c) Define order and molecularity of a chemical reaction and explain with a suitable example the difference between the two. (3)
- (d) What is Spreading Coefficient? What is its significance? (3)
- (e) What is ion selective electrode? Give one example (2)
- (f) Give the classification of colloids. (2)

- Q.2 (a) What is a buffer solution? Discuss the term "Tonicity of a solution". Write in brief about "biological buffers". (4)

OR

- (a) What are applications of buffers in pharmaceutical industry? What is the difference between isotonic solution and iso-osmotic solution? (4)
- (b) State phase rule and define each term involved in the phase rule. Draw a neat phase diagram of any two component system. (4)
- (c) Derive equation for the specific reaction rate constant of a second order reaction ($a=b$). (3)

- Q.3 (a) What is the difference between ideal and non-ideal solution? What is partition coefficient? Comment on partition coefficient of benzoic acid between water and benzene. (4)

- (b) Discuss any one method to determine order of a chemical reaction. (4)

OR

- (b) Define energy of activation and give application of Arrhenius equation. (3)
- (c) What is the difference between soluble monolayer and insoluble monolayer? State Gibb's adsorption equation. (3)

- Q.4 (a) Give a short account of Bronsted-Lowry and Lewis electronic theory of acid and base. (4)

- (b) Give the classification of electrodes and draw a neat diagram of a glass electrode. (3)

- (c) Discuss in detail the optical and kinetic properties of colloids. (4)

OR

- (c) Give an account of electrical properties of colloids (Discuss either electrophoretic mobility or the zeta potential) (3)

- Q.5 (a) How does transition state theory explains the endothermic and exothermic reaction? (3)

- (b) What is the difference between adsorption and absorption? Discuss "Langmuir Adsorption Isotherm". Give its application. (4)

- (c) Define gold number and explain how to determine it. (4)

OR

- (c) What is protective colloid? State and explain Schultz and Hardy rule. (4)

- Q.6 (a) If a drug decomposes by first order mechanism and its shelf life is 4 months calculate the specific reaction rate constant of the drug decomposition process. (3)
- (b) Discuss in detail drop weight method to determine the surface tension of a liquid. (4)
- (c) What is a concentration cell? Explain with suitable example. Write the equation for the emf of a concentration cell. (4)