

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7918

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Unique Paper Code : 2173010030

Name of the Paper : CHEMISTRY OF COLLOIDS AND ADSORPTION

Name of the Course : B.Sc. (Prog.): DSE

Semester : VIII

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No- on the top immediately on receipt of this question paper.
2. Attempt any four questions in all. Q: 1 is compulsory. Each question is of equal marks.

Q: 1 Attempt any *five* of the following questions:

- a) Explain, why the surface tension of a solvent is not modified to a large extent in the presence of surface-inactive substances.
- b) Differentiate between lyophilic and lyophobic colloids with suitable example.
- c) Calculate the Hydrophile-Lypophile Balance (HLB) of a mixture of two emulsifiers containing 40% surfactant A (HLB = 12) and 60% surfactant B (HLB = 15)
- d) Discuss the main characteristics of physisorption & chemisorption with examples.
- e) A colloidal sample shows faster Brownian motion at higher temperature. State the reason.
- f) Determine the gold number if 10 mL of gold sol requires 5 mg of gelatin to prevent coagulation.

(5x3)

P.T.O.

- Q:2** a) What are Macromolecules? What properties of colloids do they show? Why they don't show electrophoresis?
b) Why MgCl_2 is better coagulant than KCl for As_2S_3 sol. Explain on the basis of the Schulze-Hardy rule.
c) Classify the following sols according to their charge: gold sol, ferric hydroxide, gelatin, blood, sulphur, arsenious sulphide. What is the origin & significance of charge on a colloidal particle?

(5,5,5)

- Q:3** a) Discuss the process of dialysis and ultrafiltration for purification of colloids with labeled diagram along with respective examples, if any.
b) Discuss protein-based functional colloids and their importance.
c) Explain peptization as a method of preparation of colloids.

(5,5,5)

- Q:4** a) Explain optical properties of colloids with emphasis on Tyndall effect.
b) Briefly discuss any five applications of colloids in everyday life & industry.
c) What is protective colloid? How does a hydrophilic colloid stabilize a hydrophobic one? Give an account of Gold Number in this context.

(5,5,5)

- Q:5** a) Outline the assumptions made during the derivation of Langmuir adsorption equation and hence derive its equation.
b) Discuss how the extent of adsorption varies on
(i) increasing the surface area per unit mass of adsorbent,
(ii) increasing the temperature of the system, and
(iii) increasing the pressure of the gas.
c) The surface tension of ethanol-water mixtures follows the equation
where c is the molar concentration of ethanol. The temperature is 298 K. Calculate the surface excess of ethanol for a 0.5 mol dm^{-3} solution.

(5,5,5)

Q:6 Write short notes any *three* of the following options:

- a) Application of adsorption phenomenon in living systems
- b) Coagulation & Flocculation
- c) Associated Colloids (with examples & diagram)
- d) Emulsification by Surfactants

(5,5,5)