

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7241

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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.
3. Each question is of equal marks.

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

- a) Explain, why the surface tension of a liquid is very much modified in the presence of surface-active substances.
- b) Differentiate between colloidal solution, true solution and suspension solution with suitable examples.
- c) Calculate flocculation value if 2 mL of 0.1 M NaCl coagulates 100 mL sol
- d) Classify the adsorption of gases on solids on the basis of forces of interaction between adsorbent and adsorbate. What are their main characteristics?
- e) A student observes a bright path of light while passing a beam through a sol but not through a true solution. Name the phenomenon and explain the observation.
- f) Determine % composition of two surfactants if mixture Hydrophile-Lypophile Balance HLB is 10 (HLB of A = 8, HLB of B = 12).

(5x3)

- Q:2**
- a) Explain Micelle formation with diagram & examples. Which type of colloids are they?
 - b) Explain the Schulze-Hardy rule with examples. Discuss its importance in coagulation of colloids.
 - c) Discuss the origin of charge on colloidal dispersions. Classify the following sols according to their charge: gold sol, ferric hydroxide, gelatin, blood, sulphur, arsenious sulphide.

(5,5,5)

- Q:3**
- a) Discuss the process of dialysis and electro dialysis for purification of colloids with labeled diagram along with respective examples.
 - b) Discuss protein-based functional colloids and their importance.
 - c) Explain Bredig's Arc method of preparation of colloids.

(5,5,5)

P.T.O.

Q:4 a) Explain the phenomenon of Brownian Movement of colloids with the suitable diagram.

b) Briefly discuss the colloidal phenomenon in food chemistry with few examples.

c) Define Gold Number. The gold numbers of A, B, C, and D are 0.005, 0.05, 0.5 and 5 respectively. Which of these have a greatest protective action. Give reasons.

(5,5,5)

Q:5 a) Derive the Gibbs adsorption equation & Explain the terms involved

$$\Gamma_2 = -\frac{c_2}{RT} \left(\frac{d\gamma}{dc_2} \right)$$

b) What do you understand by the terms (i) absorption, (ii) adsorption, (iii) adsorbent, and (iv) adsorbate? Assuming adsorption to be a spontaneous process, show that it is always an exothermic process.

c) In adsorption of hydrogen over a sample of copper, monolayer-formation volume per gram of powder was found to be 1.36 cm³ measured at STP. Calculate the specific surface area of copper. Liquid hydrogen has a density of 0.07 g cm⁻³.

(5,5,5)

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

a) Factors affecting adsorption of gases on solids

b) Electrophoresis

c) Hydrophile-Lypophile Balance (HLB)

d) Surfactants as emulsifying agents

(5,5,5)