Chapter 5-Surface chemistry

LEVEL-1 QUESTIONS

1. **What do you mean by Electrophoresis?**

Ans: -. Movement of Colloidal particles towards cathode or anode by passing electricity.

2. **Describe cleansing action of soaps and detergents.**

Ans Hint: micelles formation

3. **Explain what is observed when:**

i) **A beam of light is passed through a colloidal solution.**

ii) **An electric current is passed through a colloidal solution.**

Ans (i) Scattering of light takes place called Tyndall Effect

(ii) Movement of charged particles towards oppositely charged electrodes called electrophoresis.

4. **Write short notes on:**

i) **Brownian movement.**

ii) **Hardy and Schulze rule.**

Ans (i) Zig-zag movement of colloidal particles

(ii) Oppositely charged electrolyte is added to colloidal sol. Coagulation takes place. The extent of coagulation depends on the charge on coagulating ion.

5. **What is difference between Physisorption and chemisorption?**

Ans: **Physisorption:** it is multi layered, weak Van der Waal's forces, low enthalpy, reversible, non-specific

Chemisorption:unilayered, chemical bond, high enthalpy, highly specific, irreversible.

6. **What is an adsorption isotherm? Describe Freundlich adsorption isotherm.**

Ans Isotherms are the curves drawn – extent of adsorption vs. pressure at constant temperature.

$\frac{x}{m} = kp^{1/n}$

7. **What are lyophilic and lyophobic sols? Give one example of each type.**

Ans**Lyophilic:** They are solvent loving sols., stable, reversible; can be prepared bymixing dispersed phase with dispersion medium. Ex: starch sol.

Lyophobic: they are solvent hating sols., unstable, irreversible, can be prepared by chemical methods. Ex: gold sol.

Hydrophobic sols.easily coagulated due to less affinity towards dispersion medium

LEVEL-2 QUESTIONS

1. **Explain:**

i) Sun looks red at the time of sun set.

ii) Physisorption is multimolecular while chemisorption is monomolecular.

Ans: -

i) The sun is a horizon at the time of sun set. The light emitted by the sun has to travel a relatively longer distance through the atmosphere. As a consequence the blue part of the light is scattered away by the particular matter in the atmosphere causing red part to be visible.

ii) Chemisorption occurs as a result of the reaction between adsorbent and adsorbate. When the surface of the adsorbent is covered with one layer, no further reaction can take place. So any number of layers may be formed one over the other on the surface of the adsorbent.

2. **Explain what is observed when:**

i) An electrolyte, KCl is added to hydrated ferric oxide sol.

ii) An electric current is passed through a colloidal solution.

iii) A beam of strong light is passed through a colloidal solution.

Ans: - (i)Light scattering.

(iii) Coagulation because ferric hydroxide is precipitated.

(iv) Movement of colloidal particles towards the oppositely charged electrodes.

3. **What is difference between multimolecular and macromolecular colloids? Give one example of each.**

Ans: - Multimolecular: - They contain dispersed particles less than 1 nm made of aggregates of many molecules. These are lyophobic colloids. In multimolecular, particles are held by weak van der Waals forces. Ex: - As_2S_3 , Gold sol.

Macromolecular: They are molecularly dissolved solutions of a polymer with particle size of colloidal range and are lyophilic colloids. Particles are held by chemical bonds. Ex: - Starch, cellulose,nylon.

4. **What is meant by term peptizaion?**

Ans Conversion of freshly prepared precipitate into colloidal solution using peptizing agent.

5. **Explain why hydrophobic sols are relatively more stable than hydrophobic sols.**

Ans Have more affinity towards dispersion medium.

6. **What are emulsifiers?**
   Ans Stabilizing agents that stabilize the emulsions.

7. **Give reason why a finely divided substance is more effective as an adsorbent.**
   AnsMore surface area.

8. **What are zeolites? Describe some of their features. Give two applications of zeolites.**
   They are shape selective catalysts. They have porous structure, depending upon pore size, reactants will adhere to the catalyst and converted into products. ZSM -5 is used to convert alcohols to gasoline.

LEVEL-3 QUESTIONS

1. **What is meant by Autocatalysis and Induced catalysis?**

Ans: - It is a phenomenon in which one of the products formed during the chemical reaction act as a catalyst and speeds up the reaction. For example:- Mn^{2+} ions produced during oxidation of oxalic acid by acidified $KMnO_4$ act as a catalyst and speed up the chemical reaction as it progresses.

2. **Answer the following :**

i) Why silica gel is used as dehumidizer?

ii) What is the significance of a gold number?

Ans: -

i) Silica gel is a strong adsorber of moisture present in air. That is why, it is used as dehumizider.

ii) Gold number is a measure of protective power of the colloids. Smaller the value of gold number larger will be the protective power of the colloids.

3. **Explain:**

i) Persistent dialysis of a colloidal sol is carried out.

ii) Gelatin is added to gold sol.

Ans: -

i) A small amount of electrolyte is required for the stability of the colloidal sol. On persistent dialysis, the electrolyte is almost completely removed which leads o coagulation of sol.

ii) Gelatin stabilizes the gold sol and it starts behaving like a lyophilic sol.

4. **A colloidal solution of AgI is prepared by 2 different methods-**

a) Addition of silver nitrate in KI **b) Addition of KI in $AgNO_3$**

i) What is the charge AgI colloidal particles in 2 test tubes A & B.

ii) Give reason for the origin of the charge

Ans i) Test tube A has negative charge while test tube B has positive charge on colloidal particles.

iii) Preferential adsorption.