

CHEMISTRY STUDY MATERIALS FOR CLASS 12

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Surface Chemistry (Key Points)

SHORT ANSWER QUESTIONS (3 MARKS EACH)

Q6) Account for the following:

- (i) **What is colloidion?**
- (ii) **Why do we add alum to purify water?**
- (iii) **Of physisorption and chemisorption, which type of adsorption has a higher enthalpy of adsorption?**

A6. (i) It is a 4% sol. of nitrocellulose in a mixture of alcohol and ether.

(ii) Alum coagulates colloidal impurities present in water.

(iii) Chemisorption has higher enthalpy of adsorption on account of formation of chemical bond.

Q7) (i) How can colloidal sol. of sulphur in water be prepared?

(ii) **What is electrophoresis due to ?**

(iii) **Why is $\text{Fe}(\text{OH})_3$ colloid +vely charged when prepared by adding FeCl_3 to hot water?**

A7) (i) It is prepared by oxidation of H_2S by dil. HNO_3 .

(ii) Colloidal particles carry a charge, either +ve or -ve. On passing electricity, they migrate towards the oppositely charged electrode.

(iii) The colloidal sol. of hydrated ferric oxide adsorbs +vely charged Fe^{3+} ion and therefore the colloidal sol. becomes +vely charged.

Q8) How are the following colloids different from each other in respect of dispersion medium and dispersed phase? Give an example each.

(i) **An aerosol**

(ii) **A hydrosol**

(iii) **An emulsion**

A8. (i) An aerosol is a colloidal dispersion of liquid in a gas, eg, fog

- (ii) A hydrosol is a colloidal sol. of a solid in water as the dispersion medium, eg, starch sol.
- (iii) An emulsion is a colloidal system with dispersed phase as well as dispersion medium as liquids, eg, oil in water.

Q9) Account for the following:

- (i) **On the basis of Hardy Schulze rule , explain why the coagulating power of phosphate is higher than chloride?**
- (ii) **How does a delta form at the meeting place of sea and river water?**
- (iii) **Why is chemisorptions referred to as activated adsorption?**

A9. (i) Minimum quantity of an electrolyte required to cause precipitation of a sol is called its coagulating value. Greater the charge and smaller the amount of electrolyte required for precipitation higher is the coagulating power of electrolyte.

(ii) River water is a colloidal sol. of clay and sea water contains a lot of electrolytes. Coagulation takes place at the meeting place of sea and river water the coagulated clay forms delta.

(iii) Chemisorption involves formation of bonds for which activation energy is required.

LONG ANSWER QUESTIONS

Q10). What is adsorption? How adsorption is classified? How does adsorption of a gas on a solid surface vary with (i) temperature (ii) pressure.

A10. Adsorption is a phenomenon in which concentration of solute is more at the surface and less in the bulk. Adsorption is classified as physisorption & chemisorption.

Physical adsorption of a gas on solid decreases with increase in temperature and increases with increase in pressure.

Chemical adsorption first increases and then decreases with increase in temperature.

Chemical adsorption first increases and then becomes independent of pressure with increase in pressure.

Q11) a. Define: (i) Kraft temperature (ii) Zeta potential (iii) Brownian movement

b. Arrange the following ions in increasing order of flocculating power to precipitate As_2S_3 sol:



c. Give an example of oil in water & water in oil type emulsion.

A11. (i) Kraft temperature: a particular temperature only above which formation of micelles takes place.

(ii) Zeta potential: it is the potential difference between the fixed and diffused layer of opposite charges around the colloidal particles.

(iii) Brownian movement: It is a continuous zig-zag motion of colloidal particles. It is due to the unbalanced bombardment / collision of the particles by the molecules of dispersion medium. It depends upon the size of the particles and viscosity of the solution.

b. $[\text{Fe}(\text{CN})_6]^{4-} > \text{PO}_4^{3-} > \text{SO}_4^{2-} > \text{Cl}^-$

c. Oil in water: milk and vanishing cream, Water in oil: butter and cold cream.
