

SURFACE CHEM. (QUESTION)

1 MARKS

1. What are the physical states of dispersed phase and dispersion medium of froth?
2. What is the cause of Brownian movement among colloidal particles?
3. Arrange the solutions: True solution, colloidal solution, suspension in decreasing order of their particles size?
4. Give an example of micelles system?
5. Why is it necessary to remove CO when ammonia is obtained by Haber's process?
6. How is adsorption of a gas related to its critical temperature?
7. What is meant by Shape Selective Catalyst?
8. Of the physisorption & chemisorptions, which type of adsorption has higher enthalpy of adsorption?
9. Write down the Example of Positive Sol?
10. Write down the Example of Negative Sol?

2 marks question.

- 1.(Q.) Define hardy-Schulze rule?
- 2.(Q.) Define flocculation value?
- 3.(Q.) What is the difference between a sol and a gel?
- 4.(Q.) What are macromolecular and multimolecular colloids? How are they different from associated colloids?
- 5.Q.) Give any two reasons for the origin of electrical charge on the colloidal particles.
- 6.(Q.) Differentiate between electrophoresis and electro-osmosis?
- 7.(Q.) Why lyophilic colloids are called reversible sols while lyophobic sols are called irreversible sols? Give an example of each.
- 8.(Q.) Explain cleansing action of soap.
- 9.(Q.) Differentiate between chemisorption and physisorption.
- 10.(Q.) Why is adsorption always exothermic?

Ans. 1 marks.

1. Ans - Dispersed phase is gas, dispersion medium is liquid.
2. Ans - Due to collision between particles
3. Ans – Suspension > colloidal > true solution
4. Ans – Sodium stearate ($C_{17}H_{35}COO^- Na^+$)
5. Ans- CO acts as poison catalyst for Haber's process therefore it will lower the activity of solution therefore it is necessary to remove when NH_3 obtained by Haber's process.
6. Ans- Higher the critical temperature of the gas. Greater is the ease of liquefaction.
i.e. greater Vander walls forces of attraction and hence large adsorption will occur
7. Ans – On the Shape Selective Catalyst, the rate depends upon pore size of the catalyst and the shape & size of the reactant and products molecules
8. Ans - chemisorptions.

9.Ans – Ferric hydro-oxide sol

10.Ans – Arsenic sulphide.

Ans. 2 marks

1.It is the capacity of an electrolyte to cause coagulation of a sol depends upon the number of charges on the ion having charge opposite to that possessed by the sol particles, but is independent of the charges on the ion having similar charge.

2.The number of milli moles of an electrolyte required to bring about the coagulation of one litre of a colloidal solution is called its flocculation value.

3.In a sol, dispersed medium is liquid and dispersed phase is solid. On the other hand, in a gel, dispersion medium is solid and dispersed phase is liquid.

4.Macromolecular colloids:-i)They are molecules of large size. ii) They have lyophobic property.

Multimolecular colloids:-i) They are formed by the aggregation of large number of atoms or molecules which have diameter less than 1nm.ii) They have lyophilic property. Associated colloids:-i) they are formed by the aggregation of large number of ions in concentrated solutionii) They contain both lyophilic and lyophobic groups

5.The two reasons are:

i) Due to electron capture by sol particles during electro dispersion of metals, due to preferential adsorption of ions from solution

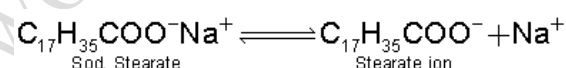
ii) Dissociation of colloidal sols.

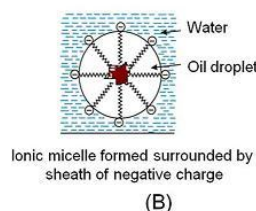
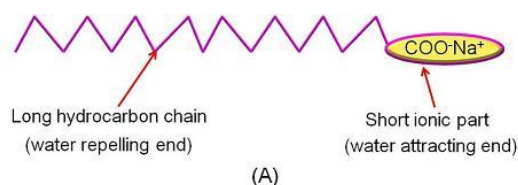
6.Electrophoresis is the movement of colloidal particles under the influence of an electrical field. Electro-osmosis is the movement of dispersion medium molecules under the influence of electric field when colloidal particles are not allowed to move

7.In the lyophilic colloids if the dispersed medium is separated from the dispersion medium the sol can be prepared again by simply remixing with the dispersion medium. So they are called reversible sols. Example: Starch.

In lyophobic sols if small amount of electrolyte is added, the sols are readily precipitated and do not give back the colloid by simple addition of the dispersion medium. So they are called irreversible sols. Example: metal sulphides.

8.Action of soap is due to emulsification and micelle formation. Soaps are sodium salt of higher fatty acids like sodium stearate, $C_{17}H_{35}COO^-Na^+$





The anionic head of stearate ion (COO^-) is hydrophobic in nature and has great affinity for water, while the hydrocarbon part ($\text{C}_{17}\text{H}_{35}$) is hydrophilic in nature and great affinity for oil, grease etc. When soap is used in water, the anions ($\text{C}_{17}\text{H}_{35}\text{COO}^-$) form micelle and encapsulate oil or grease inside. These micelle are removed by rinsing with water; while free dirt (from oil or grease) either settle down or are washed away by water. Thus the main function of a soap is to entrap oil or grease with the micelles through emulsification, thereby freeing dirt from grease and oil.

9. Physisorption. (a) The forces operating are weak van der Waal's forces.

b) The heat of adsorption is low.

c) Does not require any activation energy.

d) Forms multimolecular layer. Chemisorption:

a) Forces acting are similar to those of chemical bonds.

b) The heat of adsorption is high.

c) Requires activation energy.

d) Forms unimolecular layer.

10. Adsorption occurs because of attraction between adsorbate and adsorbent molecules and therefore, energy is always released during adsorption. Hence adsorption is an exothermic process.