

## **MINIMUM LEARNING CONTENTS OF SURFACE CHEMISTRY**

(A) Differentiate

- (i) Absorption and Adsorption
- (ii) Physical and chemical adsorption.
- (iii) Lyophobic and Lyophilic solution
- (iv) Multimolecular, Macromolecular and associated colloids
- (v) Homogeneous solution, suspension and colloids.

(B) Explain with examples:

- (i) Shape-selective catalysis.
- (ii) Peptisation, Dialysis and electro dialysis.
- (iii) Properties of colloidal solution.
  - (a) Brownian movement.
  - (b) Tyndall effect
  - (c) Electrophoresis
  - (d) Coagulation

(C) State and explain

- (i) Hardy Schulze law
- (ii) Types of emulsions.

Read study material of chemistry (2015-16)

## EXAMINATION ORIENTED QUESTION WITH ANSWERS

Q1. Why is adsorption always exothermic?

Ans: - Adsorption occurs with the decrease in entropy.

That is  $\Delta S = -ve$ , As  $\Delta G = \Delta H - T\Delta S$  and for a process to be spontaneous  $\Delta G$  must be negative. This can be possible only when  $\Delta H$  is negative.

That is why adsorption is always exothermic.

Q2. Which type of forces are responsible for the occurrence of physisorption?

Ans: - Vander wall forces.

Q3. What is the effect of temperature on chemisorptions?

Ans: - With the increase in temperature chemisorptions first increases and then decrease

Q4. Based on the type of dispersed phase what type of colloid is micelles?

Ans: - Associated Colloid.

Q5. Name the temperature above which the formation of micelles take place.

Ans: - Kroyt temperature.

Q6. of physical adsorption and chemisorption which type of adsorption has a higher enthalpy of adsorption?

Ans:-Chemisorption.

Q7. What is 'coagulation' process?

Ans:- The process of setting of colloidal particles is called coagulation.

Q8. Explain what is observed when

(i) An electric current is passed through a solution.

(ii) A beam of light is passed through a solution.

(iii) An electrolyte is added to ferric hydroxide solution.

Ans: (i) Colloidal particles moves towards the oppositely charged electrode where they lose their charge and get coagulated.

(ii) Scattering of light by the colloidal particles take place and the path of light becomes visible. (Tyndall effect).

(iii) When an electrolyte like NaCl is added to  $Fe(OH)_3$  solution, the positively charged colloidal particles of  $Fe(OH)_3$  get coagulated by the negatively charged  $Cl^-$  ions provided by NaCl.

Q9. What are the characteristics of the following,

Give examples:

- (i) Multimolecular colloids – They consists of aggregate atoms or molecule which generally have diameter less than 1n.m. they are usually lyophobic. E.g. S<sub>8</sub>, pt, Gold solution. Etc.
- (ii) Lyophobic Solution – Particles of dispersed phase have no affinity for dispersion medium, rather they hate dispersion medium. E.g. fe(OH)<sub>3</sub> AS<sub>2</sub>O<sub>3</sub> etc.
- (iii) Emulsions – Liquid-Liquid colloidal system is known as emulsion. E.g Soil in water or water in oil.

Q10. Give Reason: -

- (a) What happens when a freshly precipitated fe(OH)<sub>3</sub> is shaken with water containing a small quantity of fecl<sub>3</sub>

Ans: - colloidal Solution of fe(OH)<sub>3</sub> is formed fecl<sub>3</sub> acts as a peptizing agent.

- (b) Why is a finally divided substance more effective as an adsorbent?

Ans: - Due to greater surface area and it has more active site.

Q11. Define Peptization.

Ans: - The process of converting a ppt into colloidal Solution by shaking it which dispersion medium in presence of small amount of electrolyte is called Peptization.

Q12. Classify colloids where the dispersion medium is water, their characteristics and write an example of each of these classes.

Ans: - There are two types-

- (i) Hydrophilic – (i) Stability: - More stable as the stability due to charge and water envelop surrounding the solution particle.  
Nature – Reversible  
e.g. Starch, gum etc.

Q13. What are lyophilic and lyophobic solutions? Give one example of each type. Why is hydrophobic solution easily coagulated?

Ans: - Lyophilic Solution – In which the particle of dispersed phase have great affinity for dispersion medium. E.g. Starch solution.

Lyophobic Solution – The particles of dispersed phase have little or no affinity for the dispersion medium. E.g. Gold solution, fe(OH)<sub>3</sub>.

Lyophobic Solution easily coagulate on the addition of small amount of electrolyte because these are not stable. The stability of lyophobic solution is only due to presence of charge on colloidal particles.

Q14. Write three distinct features of chemisorption which are not found in physisorption.

Ans: - Three distinct features of chemisorption which are not found in physisorption are:

- (i) High enthalpy of adsorption w.r.t physisorption.

- (ii) High specificity : occurs only when there is a chance of forming chemical bond between adsorbate and adsorbent.
- (iii) Irreversibility: Chemisorption is irreversible in nature.

Q15. Name the two groups into which phenomenon of catalysis can be divided.

Ans: - Catalysis can be divided into following two groups –

- (i) Homogenous catalysis -



- (ii) Heterogeneous catalysis –



**Prepared by –**

Dr. N.Kumari (K.V.No.2, Gaya)

Shri. K.K. Metariya (K.V.No.1, Gaya)