Chapter - 05

Surface Chemistry

Very Short Answer Type Questions

01. Mention two ways by which lyophilic colloids can be coagulated.

02. What causes the Brownian movement in a colloidal solution?

03. What is the 'coagulation' process?

04. What is meant by shape-selective catalysis?

05. What is meant by the term peptization?

06. What is the reason for the stability of colloidal sols?

07. What type of colloid is formed when a liquid dispersed in a solid ? Give an example.

08. $CO(g)$ & $H_2(g)$ react to give different products in the presence of a different catalyst. Which ability of the catalyst is shown by this reaction.

09. Define adsorption giving an example.

10. Why is adsorption always exothermic?

Short Answer Type Questions

11. What is meant by the colloidal state of matter? Explain the following terms
(i) Multimolecular colloids (ii) Electrodialysis.

12. What happens in (i) Tyndall phenomenon (ii) Electrophoresis.\

13. Taking two examples of heterogeneous catalytic reactions, explain how a heterogenous catalyst helps in the reaction.

14. In which of the following does adsorption take place and why?
(i) Silica gel placed in the atmosphere saturated with water.
(ii) Anhydrous $CaCl_2$ placed in the atmosphere saturated with water.

15. Define adsorption. Write any two features which distinguish physisorption from chemisorption.

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

17. Define the following terms giving one example of each:
(i) Emulsion (ii) Hydrosol.

18. Explain the following terms giving a suitable example for each (i) Aerosol (ii) Emulsion.

19. What is an adsorption isotherm? Describe Freundlich adsorption isotherm?

20. Define the following terms. (i) Lyophilic colloid (ii) Zeta potential (iii) Associated colloids

Long Answer Type Questions:

21. Account for the following:

(i) Ferric hydroxide sol is positively charged.

(ii) The extent of physical adsorption decreases with rising temperature.

(iii) A delta is formed at the point where the river enters the sea.

22. Explain the following:

(i) The lyophilic colloid is more stable than a lyophobic colloid.

(ii) Coagulation takes place when sodium chloride solution is added to the colloidal solution of ferric chloride.

(iii) The sky appears to be blue.

23. Describe what is observed when

(i) an electrolyte such as NaCl is added to hydrated ferric oxide sol.

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

(iii) an electric current is passed through a colloidal solution.

24. (i) Differentiate between adsorption and absorption.

(ii) Out of $MgCl_2$ and $AlCl_3$ which one is more effective in causing a coagulation of negatively charged sol and why?

(iii) Out of sulfur sol and proteins, which one form multimolecular colloids.

25. Write one difference in each of the following :

(i) Multimolecular colloid and associated colloid.

(ii) Coagulation and peptization.

(iii) Homogeneous catalysis and heterogeneous catalysis.

26. (i) Write the dispersed phase and dispersion medium of milk.

(ii) Write one similarity between physisorption and chemisorption.

(iii) Write the chemical method by which $Fe(OH)_3$ sol is prepared from $FeCl_3$

27. Give a reason for the following.

(i) Measurement of the osmotic pressure method is preferred for the determination of molar masses of macromolecules such as proteins and polymers.

(ii) Aquatic animals are more comfortable in cold water than in warm water.

(iii) The elevation of the boiling point of the 1M KCl solution is nearly double that of the 1M sugar solution.

28. (i) Adsorption of gas in the surface of a solid is generally accompanied by a decrease in entropy, still, it is a spontaneous process. Explain.

(ii) Some substances can act both as colloids and crystalloids explain.

(iii) What will be the charge on AgI colloidal particles when it is prepared by adding a small amount of $AgNO_3$ solution to KI solution in water. What is responsible for the development of this charge?

29. Give a reason for the following observations :

(i) Leather gets hardened after tanning.

(ii) Lyophilic sol is more stable than lyophobic sol.

(iii) It is necessary to remove CO when ammonia is prepared by Haber's process.

30. How are the two types of emulsions different from one another ? Give suitable examples to justify the difference. State two applications of emulsion.