

SURFACE CHEMISTRY - Previous HSE Questions

1. Explain any 3 chemical methods for the preparation of lyophobic colloids with suitable examples. (3) [SAY 2018]
2. (a) State Hardy-Schulze rule with the help of example.
(b) Why lyophilic colloids are used as protective colloids? [March 2018]
3. a) Which among the following is not an electrical property of colloids?
i) Electrophoresis ii) Electro osmosis iii) Coagulation iv) Tyndall effect (1)
b) Freundlich adsorption isotherm is $x/m = k.p^{1/n}$, where $n > 1$. Answer the following questions based on Freundlich adsorption isotherm:
i) What is adsorption isotherm? (1)
ii) Explain the terms in the above equation. (1) [SAY 2017]
4. There are mainly two types of adsorption. They are physisorption and chemisorption.
a) Differentiate between physisorption and chemisorption. (2)
b) Write any two applications of adsorption. (1) [March 2017]
5. Dispersed phase and dispersion medium are two phases of a colloidal system.
a) Name the colloid in which dispersed phase is liquid and dispersion medium is solid.
(i) Sol (ii) Foam (iii) Emulsion (iv) Gel (1)
b) Physisorption and chemisorption are two types of adsorption. Write any four differences between them.
(2) [Say 2016]
6. (i) Catalysis can be classified into two groups - homogeneous and heterogeneous.
a) What do you mean by homogeneous catalysis?
b) Write one example for heterogeneous catalysis. (2)
(ii) Which of the following is an emulsifying agent?
a) Milk b) Butter c) Gum d) Lamp black (1) [March 2016]
7. a) Which of the following is an example of adsorption?
i) Water on silica gel ii) Water on CaCl_2 iii) H_2 on finely divided Nickel iv) O_2 on metal surface (1)
b) Write any two differences between absorption and adsorption. (2)
8. Based on the particles of dispersed phase, colloidal systems are classified into multimolecular, macromolecular and associated colloids.
a) Which of the following is an example for multimolecular colloidal system?
i) Starch in water ii) Soap solution iii) Ferric hydroxide in water iv) Polyvinyl alcohol in water (1)
b) Associated colloids are also known as micelles. How are they formed? (2) [SAY 2015]
9. a) Which of the following is lyophobic colloid?
a) Starch in water ii) Gum in water iii) Soap in water iv) Gold sol (1)
b) Write any four applications of colloids. (2) [March 2015]
10. Sols are colloidal systems in which dispersion medium is liquid and dispersed phase is solid.
a) Write any four differences between lyophilic sols and lyophobic sols. (2)
b) Peptisation is a method of preparation of sols. Write a general procedure for peptisation. (1) [March 2014]
11. a) Adsorption has many applications. Write any two applications of adsorption. (1)
b) Physisorption and chemisorption are the two types of adsorption. Write any four differences between them.
(2) [SAY 2014]
12. The accumulation of molecular species at the surface rather than in the bulk of a solid or liquid is termed adsorption.
a) What is adsorption isotherm? (1)



- b) Write the mathematical expression of Freundlich adsorption isotherm? (1)
 c) Enzymes are known as biochemical catalysts. Write any 2 characteristics of enzyme catalysis? (1) [March 13]
13. There are mainly two types of adsorption of gases on solids.
 a) What are the two types of adsorption of gases? (1)
 b) Write two characteristics of each of the above two types of adsorption. (2) [SAY 2013]
14. Colloids have many characteristic properties. Among these Tyndall effect is an optical property and coagulation is the process of settling of colloidal particles.
 a) What is Tyndall effect?
 b) State Hardy Schulze rule which deals with the coagulation of colloids by the addition of an electrolyte.
 c) What is a protective colloid? (1+1+1 = 3) [March 2012]
15. Colloids are widely used in industry and in daily life.
 a) What are colloids? (1)
 b) Write any four applications of colloids? (2) [SAY 2012]
16. Physisorption and chemisorption are two types of adsorption.
 a) What is the effect of temperature on physisorption and chemisorption? (1)
 b) In certain cases physisorption transfers to chemisorption as temperature is increased. Explain with an example. (1½)
 c) Explain how colloids get coagulated on addition of salts? (½) [March 2011]
17. Ferric hydroxide sol can be prepared from freshly prepared ferric hydroxide precipitate. It can also be prepared by adding ferric chloride solution to boiling water. In both cases the sol particles are positively charged.
 a) Name the above two methods for the preparation of ferric hydroxide sol? (1)
 b) What happens when an electric potential is applied across two platinum electrodes dipped in ferric hydroxide sol? (2) [SAY 2011]
18. Colloids exhibit some special properties.
 a) Name the property of colloid involved in the construction of ultra microscope? (½)
 b) Explain the above property (1)
 c) What are the conditions to be satisfied to exhibit Tyndall effect? (1½) [March 2010]
19. In homogenous catalysis, reactants and catalyst are in the same phase. In heterogeneous catalysis, reactants and catalyst are in different phases.
 a) Define catalysis (1)
 b) Give one example each for homogenous and heterogeneous catalysis? (2) [March 2010]
20. As_2S_3 sol particles are negatively charged.
 a) What happens when Barium chloride solution is added to the above sol? (½)
 b) How do you account for the above process? (½)
 c) What is the effect of adding Aluminium Chloride instead of Barium chloride? Justify. (1) [March 2009]
21. The chromatographic separation is possible due to different adsorption tendencies of the solution.
 a) Name the adsorption isotherms applicable in this case. (1)
 b) Write the equations for the adsorption isotherms. (1)
 c) Draw the graphical representation of adsorption isotherm. (1) [March 2008]
22. Classify the following into homogenous and heterogeneous catalysis:
 a) Catalytic decomposition of ozone by chlorine. (1)
 b) Hydrolysis of an organic ester. (1)
 c) Haber's process (1) [Say 2008]

