

1. The size of the colloidal particles is in between:
(1) $10^{-7} - 10^{-9}$ cm. (2) $10^{-9} - 10^{-11}$ cm.
(3) $10^{-5} - 10^{-7}$ cm. (4) $10^{-2} - 10^{-3}$ cm.
2. Peptization is a process of :
(1) Precipitating the colloidal particles
(2) Purifying the colloidal sol
(3) Dispersing the precipitate into colloidal sol
(4) Movement of colloidal particles towards the oppositely charged electrodes
3. Colloids are purified by :
(1) Brownian motion (2) Precipitation
(3) Dialysis (4) Filtration
4. Flocculation value is expressed in terms of:
(1) Millimole per litre
(2) Mol per litre
(3) Gram per litre
(4) Mol per millilitre
5. Which is kinetic phenomenon?
(1) Brownian motion
(2) Tyndall effect
(3) Both (1) and (2)
(4) None of these
6. The heats of adsorption in physisorption lie in the range (in KJ mol^{-1}) :
(1) 40-400 (2) 40-100
(3) 20-40 (4) 1-10
7. According to Langmuir adsorption isotherm, the amount of gas adsorbed at very high pressure :
(1) Reaches a constant limiting value
(2) Goes on increasing with pressure
(3) Goes on decreasing with pressure
(4) Increases first and decreases later with pressure
8. Which one of the following is an incorrect statement for physisorption :
(1) It is a reversible process
(2) It requires less heat of adsorption
(3) It requires activation energy
(4) It takes place at low temperature
9. Lyophobic colloids are :-
(1) Reversible
(2) Irreversible
(3) Water loving
(4) Solvent loving
10. When freshly precipitated $\text{Fe}(\text{OH})_3$ is boiled with water in the presence of few drops of dil HCl, a hydrated ferric hydroxide sol is obtained. This method is termed as :-
(1) Dialysis (2) Peptization
(3) Ultrafiltration (4) Electrodipersion
11. To coagulate Pt sol, which of the following is most effective :-
(1) NaCl (2) Na_3PO_4
(3) AlCl_3 (4) Alcohol
12. A colloidal mixture of $\text{Fe}(\text{OH})_3$ in water is :-
(1) A hydrophilic colloid
(2) A hydrophobic colloid
(3) An emulsion
(4) None
13. A catalyst is a substance which :
(1) Increases the equilibrium concentration of the product
(2) Change the equilibrium constant of the reaction
(3) Shortens the time to reach equilibrium
(4) Supplies energy to the reaction
14. Which of the following statement is more correct:
(1) Catalyst only accelerates the rate of a chemical reaction
(2) A catalyst can retard the rate of a chemical reaction
(3) A catalyst does not affect the speed of a reaction
(4) A catalyst alters the speed of a reaction
15. Efficiency of the catalyst depends on its :-
(1) Molecular weight
(2) Number of free valencies
(3) Physical state
(4) Amount used
16. In a reversible reaction, a catalyst :-
(1) Increases the rate of forward reaction only
(2) Increases the rate of forward reaction to a greater extent than that of the backward reaction
(3) Increases the rate of forward reaction and decreases that of the backward reaction
(4) alters the rate of forward and backward reaction equally
17. Which is false for catalyst :-
(1) A catalyst can initiate a reaction
(2) It does not alter the position of equilibrium in a reversible reaction
(3) A catalyst remains unchanged in quality and composition at the end of reaction
(4) Catalysts are sometimes very specific in respect of a reaction

- 18.** Shape selective catalysts are so called because of :
 (1) The shape of the catalysts
 (2) The specificity of the catalysts
 (3) The size of the pores of the catalysts which can trap only selective molecules
 (4) Their use for only some selected reactions
- 19.** Which gas will be adsorbed on a solid to greater extent.
 (1) A gas having non polar molecule
 (2) A gas having highest critical temperature (T_c)
 (3) A gas having lowest critical temperature.
 (4) A gas having highest critical pressure.
- 20.** The nature of bonding forces in chemisorption
 (1) purely physical such as Van Der Waal's forces
 (2) purely chemical
 (3) both chemical and physical simultaneously.
 (4) none of these
- 21.** The Tyndall effect associated with colloidal particles is due to
 (1) presence of electrical charges
 (2) scattering of light
 (3) absorption of light
 (4) reflection of light
- 22.** Which one of the following is not applicable to chemisorption?
 (1) Its heat of adsorption is high
 (2) It takes place at high temperature
 (3) It is reversible
 (4) It forms mono-molecular layers
- 23.** Milk is an example of
 (1) emulsion (2) suspension
 (3) foam (4) sol.
- 24.** Colloidal particles in a sol. can be coagulated by
 (1) heating
 (2) adding an electrolyte
 (3) adding oppositely charged sol
 (4) any of the above methods
- 25.** Given below are a few electrolytes, indicate which one among them will bring about the coagulation of a gold sol. quickest and in the least of molar concentration?
 (1) NaCl (2) $MgSO_4$
 (3) $Al_2(SO_4)_3$ (4) $K_4[Fe(CN)_6]$
- 26.** The minimum concentration of an electrolyte required to cause coagulation of a sol is called
 (1) flocculation value (2) gold number
 (3) protective value (4) none of these
- 27.** Which one of following statements is not correct in respect of lyophilic sols?
 (1) There is a considerable interaction between the dispersed phase and dispersion medium
 (2) These are quite stable and are not easily coagulated
 (3) They need stabilizing agent
 (4) The particle are hydrated
- 28.** At the critical micelle concentration (CMC) the surfactant molecules
 (1) decompose
 (2) dissociate
 (3) associate
 (4) become completely soluble
- 29.** Although nitrogen does not adsorb on surface at room temperature, it adsorbs on surface at 83K. Which one of the following statements is correct -
 (1) At 83K, there is formation of monomolecular layer
 (2) At 83K, there is formation of multimolecular layer
 (3) At 83K, nitrogen molecules are held by chemical bonds
 (4) At 83K, nitrogen is adsorbed as atoms.
- 30.** The volume of a colloidal particle V_C , volume of a solute particle in a true solution V_t , the volume of suspension particle is V_s can be arranged
 (1) $V_C = V_t = V_s$ (2) $V_s < V_C < V_t$
 (3) $V_s > V_C > V_t$ (4) $V_C > V_s > V_t$

				ANSWER KEY			Exercise-I			
Que.	1	2	3	4	5	6	7	8	9	10
Ans.	3	3	3	1	1	3	1	3	2	2
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	3	2	3	4	2	4	1	1	2	2
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	2	3	1	4	3	1	3	3	2	3

PREVIOUS YEARS' QUESTIONS

EXERCISE-II

- Gold numbers of protective colloids A, B, C and D are 0.50, 0.01, 0.10 and 0.005 respectively. The correct order of their protective power is :-
[AIEEE-2008]
(1) $D < A < C < B$ (2) $C < B < D < A$
(3) $A < C < B < D$ (4) $B < D < A < C$
- Which of the following statements is incorrect regarding physisorptions ? [AIEEE-2009]
(1) Under high pressure it results into multi molecular layer on adsorbent surface
(2) Enthalpy of adsorption ($\Delta H_{\text{adsorption}}$) is low and positive
(3) It occurs because of Van der Waal's forces
(4) More easily liquefiable gases are adsorbed readily
- Among the electrolytes Na_2SO_4 , CaCl_2 , $\text{Al}(\text{SO}_4)_3$ and NH_4Cl , the most effective coagulating agent for Sb_2S_3 sol is : [IIT-2009]
(1) Na_2SO_4
(2) CaCl_2
(3) $\text{Al}_2(\text{SO}_4)_3$
(4) NH_4Cl
- The correct statement(s) pertaining to the adsorption of a gas on a solid surface is (are) - [IIT-2011]
(1) Adsorption is always exothermic
(2) Physisorption may transform into chemisorption at high temperature
(3) Physisorption increases with increasing temperature but chemisorption decreases with increasing temperature
(4) Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation
- According to Freundlich adsorption isotherm, which of the following is correct ? [AIEEE-2012]
(1) $\frac{x}{m} \propto p^0$
(2) $\frac{x}{m} \propto p^1$
(3) $\frac{x}{m} \propto p^{1/n}$
(4) All the above are correct for different ranges of pressure
- If x is the mass of the gas adsorbed on mass m of the absorbent at pressure p , Freundlich adsorption isotherm gives a straight line on plotting :- [AIEEE-2012 (Online)]
(1) $\frac{x}{m}$ vs p (2) $\log \frac{x}{m}$ vs $\log p$
(3) $\log \frac{x}{m}$ vs p (4) $\frac{x}{m}$ vs $\frac{1}{p}$
- Fog is a colloidal solution of :- [AIEEE-2012 (Online)]
(1) Gaseous particles dispersed in a liquid
(2) Solid particles dispersed in a liquid
(3) Liquid particles dispersed in gas
(4) Solid particle dispersed in gas
- The coagulating power of electrolytes having ions Na^+ , Al^{3+} and Ba^{2+} for arsenic sulphide sol increases in the order :- [JEE (MAIN) 2013]
(1) $\text{Al}^{3+} < \text{Ba}^{2+} < \text{Na}^+$ (2) $\text{Na}^+ < \text{Ba}^{2+} < \text{Al}^{3+}$
(3) $\text{Ba}^{2+} < \text{Na}^+ < \text{Al}^{3+}$ (4) $\text{Al}^{3+} < \text{Na}^+ < \text{Ba}^{2+}$
- The migration of dispersion medium under the influence of an electric potential is called : [JEE (MAIN) 2013 (Online)]
(1) Electrophoresis (2) Cataphoresis
(3) Electroosmosis (4) Sedimentation
- Smoke is an example of : [JEE (MAIN) 2013 (Online)]
(1) Solid dispersed in solid
(2) Solid dispersed in gas
(3) Gas dispersed in solid
(4) Gas dispersed in liquid
- For a linear plot of $\log(x/m)$ versus $\log p$ in a Freundlich adsorption isotherm, which of the following statements is correct ? (k and n are constants) [JEE (MAIN) 2016]
(1) $\log (1/n)$ appears as the intercept
(2) Both k and $1/n$ appear in the slope term
(3) $1/n$ appears as the intercept
(4) Only $1/n$ appears as the slope
- Gold numbers of some colloids are :
Gelatin : 0.005 – 0.01, Gum Arabic : 0.15 – 0.25 ; Oleate : 0.04 – 1.0, Starch : 15 – 25. Which among these is a better protective colloid ? [JEE (MAIN) 2016 (Online)]
(1) Oleate (2) Gelatin
(3) Gum-Arabic (4) Starch

- 13.** A particular adsorption process has the following characteristics: (i) It arises due to van der Waals forces and (ii) it is reversible. Identify the correct statement that describes the above adsorption process : **[JEE (MAIN) 2016 (Online)]**

- (1) Enthalpy of adsorption is greater than 100 kJ mol^{-1}
- (2) Energy of activation is low.
- (3) Adsorption is monolayer
- (4) Adsorption increases with increase in temperature.

- 14.** For a linear plot of $\log(x/m)$ versus $\log p$ in a Freundlich adsorption isotherm, which of the following statements is correct ? (k and n are constants) **[JEE (MAIN) 2016 (Offline)]**

- (1) $\log(1/n)$ appears as the intercept
- (2) Both k and $1/n$ appear in the slope term
- (3) $1/n$ appears as the intercept
- (4) Only $1/n$ appears as the slope

- 15.** The Tyndall effect is observed only when following conditions are satisfied :- **[JEE (MAIN) 2017]**

- (a) The diameter of the dispersed particles is much smaller than the wavelength of the light used.
 - (b) The diameter of the dispersed particle is not much smaller than the wavelength of the light used.
 - (c) The refractive indices of the dispersed phase and dispersion medium are almost similar in magnitude.
 - (d) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude.
- (1) (a) and (d)
 - (2) (b) and (d)
 - (3) (a) and (c)
 - (4) (b) and (c)

- 16.** Among the following, correct statement is :

[JEE-Main (online)2017]

- (1) One would expect charcoal to adsorb chlorine more than hydrogen sulphide.
- (2) Brownian movement is more pronounced for smaller particles than for bigger-particles.
- (3) Hardy Schulze law states that bigger the size of the ions, the greater is its coagulating power
- (4) Sols of metal sulphides are lyophilic

- 17.** Adsorption of a gas on a surface follows Freundlich

adsorption isotherm. Plot of $\log \frac{x}{m}$ versus $\log p$ gives

a straight line with slope equal to 0.5, then :

[JEE-Main (online)2017]

($\frac{x}{m}$ is the mass of the gas adsorbed per gram of adsorbent)

- (1) Adsorption is proportional to the square of pressure.
- (2) Adsorption is independent of pressure.
- (3) Adsorption is proportional to the pressure.
- (4) Adsorption is proportional to the square root of pressure.

- 18.** Which one of the following is not a property of physical adsorption **[JEE-Main (online)2018]**

- (1) Unilayer adsorption occurs
- (2) Greater the surface area, more the adsorption
- (3) Lower the temperature, more the adsorption
- (4) Higher the pressure, more the adsorption

PREVIOUS YEARS QUESTIONS				ANSWER KEY			Exercise-II			
Que.	1	2	3	4	5	6	7	8	9	10
Ans.	3	2	3	1,2,4	4	2	3	2	3	
Que.	11	12	13	14	15	16	17	18		
Ans.	4	2	2	4	2	2	4	1		