Exercise-1

> Marked Questions may have for Revision Questions.

ONLY ONE OPTION CORRECT TYPE

Section (A) : Adsorption

- 1. Which of the following statements about physical adsorption is not correct ?
 - (1) It is usually monolayer
 - (2) It is reversible in nature
 - (3) It involves van der Waals interactions between adsorbent and adsorbate
 - (4) It involves small enthalpy of adsorption as compared to chemisorption.
- 2.> Which of the following statements regarding adsorption is not correct ?
 - (1) Extent of adsorption of gases on charcoal increases with increase in pressure of the gas
 - (2) Extent of adsorption is independent of temperature
 - (3) Extent of chemisorption by a given mass of adsorbent is limited
 - (4) Extent of adsorption is dependent on the nature of adsorbent
- 3. There is desorption of physical adsorption when:
 - (1) temperature is increased
 - (3) pressure is increased

- (2) temperature is decreased (4) concentration is increased
- 4. The rate of chemisorption :
 - (1) decreases with increase of pressure
 - (3) is independent of pressure
- (2) increases with increase of pressure
- (4) is independent of temperature
- Which of the following statements about chemisorption is not applicable? 5.2
 - (1) It involves chemical forces between adsorbent and absorbate
 - (2) It is irreversible in nature
 - (3) It involves high heat of adsorption
 - (4) It involves low activation energy
- 6. Which of the following is not characteristic of chemisorption?
 - (1) it is irreversible

- (2) it is specific
- (3) it is multilayer phenomenon (4) heat of adsorption of about - 400 kJ
- 7.>> Softening of hard water is done using sodium aluminium silicate (zeolite). The causes :
 - (1) adsorption of Ca²⁺ and Mg²⁺ ions of hard water replacing Na⁺ ions.
 - (2) adsorption of Ca²⁺ and Mg²⁺ ions of hard water replacing Al³⁺ ions
 - (3) both (1) and (2)
 - (4) none of these

Section (B) : Catalysts

- 1. Which one is false in the following statement ?
 - (1) A catalyst is specific in its action
 - (2) A very small amount of the catalyst alters the rate of a reaction
 - (3) The number of free vacancies on the surface of the catalyst increases on sub-division
 - (4) Ni is used as a catalyst in the manufacture of ammonia
- 2. A catalyst increases rate of reaction by :
 - (1) decreasing enthalpy

- (2) decreasing internal energy
- (3) decreasing activation energy
- (4) increasing activation energy

Which requires catalyst ? 3.2 (1) $S + O_2 \longrightarrow SO_2$ $(2) 2SO_2 + O_2 \longrightarrow 2SO_3$ $(3) C + O_2 \longrightarrow CO_2$ (4) All 4.> A catalyst in a reaction : (1) increases the activation energy of the forward reaction. (2) increases the activation energy of the backward reaction. (3) increases the activation energy of both the reactions. (4) decreases the activation energy of both the reactions. 5. A catalyst in a reaction changes which of the following ? (1) Equilibrium constant (2) Entropy (3) Rate constant (4) Nature of products. Consider the following reactions ; 6. (i) $2SO_2 + O_2 \rightleftharpoons 2SO_3$ (ii) $N_2 + 3H_2 \implies 2NH_3$ (iii) $N_2 + O_2 \implies 2NO$ (iv) $H_2 + I_2 \implies 2HI$ The reactions which require a catalyst are : (3) (i) and (ii) (1) (i) and (iii) (2) (ii) and (iv) (4) all of these 7. Which of the following kind of catalysis can be explained by the adsorption theory ? (1) Homogeneous catalysis (2) Acid-bas catalysis (3) Heterogeneous catalysis (4) Enzyme catalysis 8.2 A biological catalyst is essentially : (1) an enzyme (2) a carbohydrate (3) an amino acid (4) a nitrogeneous base Section (C): Classification, Preparation & Purification of Colloid 1.2 Colloidal solution of gold prepared by different methods of different colours because of : (1) different diameters of colloidal gold particles (2) variable valency of gold (3) different concentration of gold particles (4) impurities produced by different methods 2. An example of intrinsic colloid (lyophilic colloids) is : (4) Au sol (1) As_2S_3 sol (2) Fe(OH), sol (3) Egg albumin Which of the following sols is negatively charged? 3.2 (1) Arsenious sulphide (2) Aluminium hydroxide (3) Ferric hydroxide (4) Silver iodide in silver nitrate solution 4. Peptisation is: (1) conversion of a colloidal into precipitate form (2) conversion of precipitate into colloidal sol (3) conversion of metal into colloidal sol by passage of electric current (4) conversion of colloidal sol into macromolecules Bleeding is stopped by the application of ferric chloride. This is because: 5. (1) the blood starts flowing in opposite direction (2) the blood reacts and forms a solid, which seals the blood vessel (3) the blood is coagulated and thus the blood vessel is sealed (4) the ferric chloride seals the blood vessel. Which of the following is a hydrophilic colloidal sol? 6. (1) Barium sulphate sol (2) Arsenious sulphide sol

- (3) Starch sol
- (4) Silver iodide sol

7.>	Cloud is an example of :							
	(1) solid dispersed in g(3) liquid dispersed in s	as solid	(2) liquid dispersed in g(4) solid dispersed in liquid	jas quid				
8.	Which one among the (1) Gum	following sols is hydroph (2) Gelatin	obic ? (3) Starch	(4) Sulphur				
9.	Colloidal gold is prepar (1) mechanical dispers (3) Bredig's arc method	red by : ion d	(2) peptisation (4) hydrolysis					
10.	Tyndall effect is observ (1) solution	red in : (2) precipitate	(3) sol	(4) vapour				
11.	Lyophillic colloids are s (1) charge on the partic (3) small size of the pa	table due to : cle rticle	(2) large size of the par (4) layer of dispersion r	ticle nedium on the particles				
12. 🖎	Peptization is a proces (1) precipitation of colloi (2) purification of colloi (3) dispersing precipita (4) movement of colloid	s of : bidal particles. ds. te into colloidal sols. dal particles in the electric	cal field.					
Section	on (D) : Coagulatio	n, Protection & App	lication of colloid					
1.	 Gold number of a lyophilic sol is such property that: (1) the larger its value, the greater is the peptising power (2) the lower its value, the greater is the peptising power (3) the lower its value, the greater is the protecting power (4) the larger its value, the greater is the protecting power 							
2.౫	Protective sols are : (1) lyophilic	(2) lyophobic	(3) both (1) and (2)	(4) none of (1) and (2)				
3.	Which of the following (1) K ⁺	ions is most effective in t (2) Mg ²⁺	n the coagulation of an arsenious sulphide soluti (3) Al ³⁺ (4) C					
4.>	Which of the following (1) Cl [−]	ions is most effective in t (2) Br⁻	he coagulation of ferric h (3) NO ₂ ⁻	ydroxide solution ? (4) SO ₄ ²⁻				
5.	Gold number gives : (1) the amount of gold (2) the amount of gold (3) the amount of gold (4) none of the above.	present in the colloid. required to break the coll required to product the c	loid. olloid.					
6.	Gelatin is mostly used (1) prevent making of (2) stabilize the colloid (3) stabilize the mixture (4) enrich the aroma.	in making ice cream in or a colloid. and prevent crystallizatic e.	rder to : on.					
7.>	Which one of the follow (1) NaCl	/ing will have the highest (2) BaCl ₂	coagulation power for a (3) K_2CrO_4	ferric hydroxide sol ? (4) K ₃ [Fe(CN) ₆]				

Section (E) : Emulsion & Micelle

1.	Small liquid droplets dis (1) Suspension	spersd in another liquid is (2) Emulsion	called : (3) Gel	(4) True solution			
2.为	At CMC, the surfactant (1) Decomposes (3) Associate	molecules :	(2) Become completely soluble(4) Dissociate				
3.	In which one of the follo (1) Tyndall effect (3) Electrophoresis	owing properties emulsior	ns differ from colloidal sols ? (2) Brownian movement (4) Size of the particles of the dispersed phase				
4.≿	Cod liver oil is : (1) fat dispersed in wate (3) water dispersed in c	ər il	(2) water dispersed in fat(4) fat dispersed in oil				
	Exercise-	2					
1.	Soaking of water by a s (1) simple adsorption	ponge is an example of : (2) physical adsorption	(3) chemisoption	(4) absorption			
2.	Which is not a purely su (1) Surface tension.	urface phenomena ? (2) Adsorption.	(3) Absorption.	(4) None of these.			
3.	Which one is not the ch (1) Multilayer adsorption (3) Strong adsorption by	aracteristic of chemisorp n y adsorption sites	otion ? (2) Exothermic nature (4) Irreversible				
4.>>	Size of colloidal particle (1) 1 to 1000 nm	es may range from (2) 10 to 100 pm	(3) 1 to 100 µm	(4) 1 to 10 mm			
5.≥	Coagulation value of the electrolytes $AlCl_3$ and $NaCl$ for As_2S_3 sol are 0.093 and 52 repectively. H many times $AlCl_3$ has greater coagulating power than $NaCl$.						
6.	Graph between log x/m and ln k = 0.693, the an (1) 1	and log p is a straight lir nount of solute adsorbed (2) 1.5	ne inclined at an angle of per gm of adsorbent wil (3) 0.25	f 45º. When pressure is 0.5 atm l be (4) 2.5			
7.	Which of the following s(1) It is not easily solvat(2) It is unstable(3) The coagulation of t(4) It is quite stable in a	statements is correct for a ted his sol is irreversible in na solvent	a lyophilic solution ? ature				
8.	Liquid-liquid sol is know (1) aerosol	/n as (2) foam	(3) emulsion	(4) gel			
9.	The colloidal system co (1) aerosol	nsisting of a liquid adsorl (2) foam	bate in a solid adsorbent (3) emulsion	is termed as (4) gel			
10.	 Which of the following s (1) A colloidal solution (2) Silver sol in water is (3) Metal hydroxides in (4) Liquid-liquid colloidal 	statements is not correct is a heterogeneous two-p an example of lyophilic s water are examples of ly al solution is not a stable	? bhase system solution. ophobic solution system				
11.	Which of the following r (1) Starch	epresents a multimolecul (2) A sol of gold	lar colloidal particles? (3) Proteins	(4) Soaps			

12.∖≳	Which of the following ar (1) Cl [−]	nions will have minimum (2) Br⁻	flocculation value for the (3) SO_4^{2-}	e ferric oxide solution ? (4) [Fe(CN) ₆ l ³⁻					
13.	Which of the following re (1) Solution of gold	presents a macromolec (2) Cellulose	ular colloidal particles ? (3) Soaps	(4) Synthetic detergents					
14. 🕿	Which of the following st (1) Peptization is the pro (2) Metal sols of gold, sil (3) Impurities present in (4) Dialysis is a process	atements is not correct? cess by which certain su ver and platinum can be a solution makes it more to remove impurities of i	ubstances are converted prepared by Bredig's ar stable ons and molecules from	into the colloidal state c method. a solution.					
15.	 Select correct statement (s): (1) hydrophilic colloid is a colloid in which there is a strong attraction between the dispersed phase and water (2) hydrophobic colloid is a colloid in which there is a lack of attraction between the dispersed phase and water (3) hydrophobic sols are often formed when a solid crystallises rapidly from a chemical reaction or a supersaturated solution (4) all of the above 								
16.	A reddish brown sol (containing Fe ³⁺) is obtained by: (1) the addition of small amount of FeCl ₃ solution to freshly prepared Fe(OH) ₃ precipitate (2) the addition of Fe(OH) ₃ to freshly prepared FeCl ₃ solution (3) the addition of NH ₄ OH to FeCl ₃ solution dropwise (4) the addition of NaOH to FeCl ₃ solution dropwise								
17.≿	Which is not an example (1) curdling of milk (3) formation of deltas at	of coagulation?	(2) purification of water(4) All the three are exa	by addition of alum mple of coagulation					
18.	Gold number of some lyo I : Casein II : Haemog III : Gum ara IV : Sodium Which has maximum pro- (1) I	philic sols are : : 0.01 globin : 0.03 abic : 0.15 oleate : 0.40 otective power : (2) II	(3) III	(4) IV					
19.≿	Arsenic (III) sulphide for should be most effective (1) KCI	orms a sol with a nega in coagulating the sol ? (2) MgCl	(c) and the starge. Which of the start of th	(4) Na PO,					
20.	The stabilisation of a lyo (1) preferential adsorptio (2) the large electro-kine (3) the formation of a co (4) the viscosity of the m	phobic colloid is due to : on of similiar charged par tic potential developed in valent bond between tw edium	rticle on colloids surface n the colloid o phases						
21.	Smoke has generally blu (1) scattering	le tinge. It is due to (2) coagulation	(3) Brownian motion	(4) electro-osmosis					
22.	Compared to common co (1) higher colligative prop (3) same colligative prop	olloidal sols, micelles ha perties erties	ave: (2) lower colligative properties (4) none of these						

23. Which one of the following statements is false for hydrophilic sols ? (1) they do not require electrolytes for stability (2) their viscosity is of the order of that of water (3) their surface tension is usually lower than that of dispersion medium. (4) none of these 24. Which one of the following statements is correct: (1) Brownian movement is more pronounced for smaller particles than for bigger ones (2) Sols of metal sulphides are lyophilic (3) Schulze-Hardy law states, the bigger the size of the ion, the greater is its coagulating power (4) One would expect charcoal to adsorb hydrogen gas more strongly than chlorine. 25. Colloidal solutions of gold prepared by different methods are of different colours because of: (1) different diameters of colloidal gold particles (2) variable valency of gold (3) different concentration of gold particles (4) impurities produced by different methods 26. 🖎 The potential difference between the fixed charged layer and the diffused layer having opposite charge is called : (1) Water potential (2) Zeta potential (3) Electrode potential (4) None of these 27. Lyophilic sols are (1) Irreversible sols (2) They are prepared from inorganic compound (3) Coagulated by adding electrolytes (4) Self-stabilizing 28. Among the following, the surfactant that will form micelles in aqueous solution at the lowest molar concentration at ambinent condition is : (2) CH₃(CH₂)₁₁OSO₃-Na⁺ (1) CH₃(CH₂)₁₅N⁺(CH₃)₃Br⁻ (3) CH₃(CH₂)₆COO⁻Na⁺ (4) CH₃(CH₂)₁₁N⁺(CH₃)₃Br⁻ 29. Among the electrolytes Na₂SO₄, CaCl₂, Al₂(SO₄)₃ and NH₄Cl, the most effective coagulating agent for Sb₂S₃ sol is : (1) Na_2SO_4 (2) CaCl (3) $AI_{2}(SO_{4})_{3}$ (4) NH₄CI 30. Methylene blue, from its aqueous solution, is adsorbed on activated charcoal at 25° C. For this process, the correct statement is (1) The adsorption requires activation at 25°C. (2) The adsorption is accompanied by a decreases in enthalpy. (3) The adsorption increases with increase of temperature. (4) The adsorption is irreversible.

Exercise-3

PART - I : NEET / AIPMT QUESTION (PREVIOUS YEARS)

1.	The method usually employed for the precip	[AIPMT 2000]	
	(1) dialysis	(2) addition of electrolytes	
	(3) diffusion through animal membrane	(4) condensation	
2.	Which is not correct regarding the adsorptio	[AIPMT 2001]	
	(1) On increasing temperature adsorption in		
	(2) Enthalpy and entropy change is negative		
	(2) Advantion is more for some enseifie sub		

(3) Adsorption is more for some specific substance

(4) Reversible

3.	Position of non-polar a (1) polar at outer surfa (2) polar at inner surfa (3) distributed all over (4) present in the surfa		[AIPMT 2002]		
4.	According to adsorptio	n theory of catalysis, the f the reactant molecules	speed of the reaction in at the active centres of	creases because the catalyst beco	e : [AIPMT 2003] mes high due to
	adsorption. (2) in the process of ad (3) adsorption product (4) adsorption lowers t	dsorption, the activation e s heat which increases th he activation energy of th	energy of the molecules ne speed of reaction. ne reaction.	becomes large.	
5.	Which of the following (1) Sodium ethyl sulph (3) Urea	forms cationic micelles a ate	bove certain concentrat (2) Sodium acetate (4) Cethyl trimethyl an	ion? nmonium bromid	[AIPMT 2004] e
6.	Which one of the follow (1) They are used as c (2) They have open str (3) Zeolites are alumin (4) Some of the SiO_4^{4-}	ecules. olites.	[AIPMT 2004]		
7.	Which one of the follow	ving forms micelles in aq	ueous solution above ce	ertain concentrati	on?
	(1) Urea (3) Pyridinium chloride		(2) Dodecyl trimethyl a (4) Glucose	ammonium chlori	de
8.	A polt of log x/m versu to :	s log p for the adsorptior	n of a gas on a solid give	es a straight line	with slope equal [AIPMT 2006]
	(1) $\frac{1}{n}$	(2) log K	(3) – log K	(4) n	
9.	Langmuir adsorption is (1) the adsorbed mole (2) the adsorption take (3) the adsorption sites (4) the heat of adsorpt	cles.	[AIPMT 2007]		
10.	In Freundlich Adsorptio (1) between 0 and 1 in (3) 1 in case of physica	on isotherm, the value of all cases al adsorption	1/n is : (2) between 2 and 4 ir (4) 1 in case of chemis	all cases	[AIPMT 2012]
11.	The ease of adsorption	n of the hydrated alkali m	etal ions on an ion-exch	ange resins follo	ws the order : [AIPMT 2012]
	(1) Li⁺ < K⁺ < Na⁺ < Rb (3) K⁺ < Na⁺ < Rb⁺ < Li	+	(2) Rb⁺ < K⁺ < Na⁺ < L (4) Na⁺ < Li⁺ < K⁺ < Rb	i+ +	[/0]
12.	The protecting power of (1) Coagulation value (3) Critical miscelle co	of lyophilic colloidal sol is	expressed in terms of : (2) Gold number (4) Oxidation number		[AIPMT 2012]
13.	Which property of collo (1) Coagulation	oids is not dependent on (2) Electrophoresis	the charge on colloidal p (3) Electro-osmosis	oarticles ? (4) Tyndall eff	[AIPMT 2014] ect

14. Which of the following statements is correct for the spontaneous adsorption of a gas? [AIPMT 2014] (1) ΔS is negative and therefore, ΔH should be highly positive (2) ΔS is negative and therefore, ΔH should be highly negative (3) ΔS is positive and therefore, ΔH should be negative (4) ΔS is positive and therefore, ΔH should also be highly positive 15. Which property of colloidal solution is independent of charge on the colloidal particles ? [AIPMT 2015] (3) Tyndalleffect (1) Electrophoresis (2) Electro-osmosis (4) Coagulation [NEET-1 2016] 16. Which one of the following characteristics is associated with adsorption ? (1) ΔG and ΔS are negative but ΔH is positive (2) ΔG is negative but ΔH and ΔS are positive (3) Δ G, Δ H and Δ S all are negative (4) ΔG and ΔH are negative but ΔS is positive 17. Fog is a Colloidal solution of : [NEET-1 2016] (1) Gas in gas (2) Liquid in gas (3) Gas in liquid (4) Solid in gas The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As₂S₃ are 18. given below : [NEET-2 2016] III. $(MgSO_{4}) = 0.22$ **I.** (NaCl) = 52, II. $(BaCl_2) = 0.69$ The correct order of their coagulating power is (3) || > | > ||| (2) | > || > |||(4) ||| > || > |(1) ||| > | > ||19. On which of the following properties does the coagulating power of an ion depend [NEET-2018] (1) The magnitude of the charge on the ion alone (2) The sign of charge on the ion alone (3) Both magnitude and sign of the charge on the ion (4) Size of the ion alone 20. Which mixture of the solutions will lead to the formation of negatively charged colloidal [AgI]I- sol. ? [NEET-1-2019] (1) 50 ml of 0.1 M AqNO₃ + 50 mL of 0.1 M KI (2) 50 mL of 1 M AqNO₃ + 50 mL of 1.5 M KI (3) 50 mL of 1 M AgNO₃ + 50 mL of 2 M KI (4) 50 mL of 2 M AgNO₃ + 50 mL of 1.5 M KI The correct option representing a Freundlich adsorption isotherm is -21. [NEET-2-2019] (2) $\frac{x}{m} = kp^{2.5}$ (3) $\frac{x}{m} = kp^{-0.5}$ (4) $\frac{x}{m} = kp^{-1}$ (1) $\frac{x}{m} = kp^{0.3}$ PART - II : AIIMS QUESTION (PREVIOUS YEARS) 1. Milk is colloid in which : [AIIMS 2000] (2) gas is dispersed in liquid (1) liquid is dispersed in liquid (3) sugar is dispersed in water (4) solid is dispersed in liquid [AIIMS 2000] 2. Assertion : Sky appears blue colour Reason : Colloidal particles of dust scatter blue light. (1) If both assertion and reason are true and reason is a correct explanation of assertion. (2) If both assertion and reason are true but reason is not a correct explanation of assertion. (3) If assertion is true but reason is false. (4) If both assertion and reason are false. (5) If assertion is false but reason is true. 3. Correct equation of Freundlich isotherm is [AIIMS 2000] Page 31



- (2) If both assertion and reason are true but reason is not a correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.
- (5) If assertion is false but reason is true.

- 11. According to the adsorption theory of catalysis, the speed of the reaction increases because [AIIMS 2007] (1) adorption produces heat which increases the speed of the reaction (2) adorption lowers the activation energy of the reaction (3) the concentration of reactant molecules at the active centres of the catalyst becomes high due to adorption (4) in the process of adorption, the activation energy of the molecules become large 12. Which of the following is a lyophobic colloidal solution ? [AIIMS 2008] (1) Aqueous starch solution (2) Aqueous protein solution (3) Gold sol (4) Polymer solvent in some organic solvents 13. Assertion : Colloidal solutions are stable but colloidal particles do not settle down. [AIIMS 2008] Reason : Brownian movement counters the force of gravity actively on colloidal particles. (1) If both assertion and reason are true and reason is a correct explanation of assertion. (2) If both assertion and reason are true but reason is not a correct explanation of assertion. (3) If assertion is true but reason is false. (4) If both assertion and reason are false. (5) If assertion is false but reason is true. [AIIMS 2011] 14. Which of the following is incorrect for physisorption? (1) Reversible (2) Increases with increase in temperature. (3) Low heat of adsorption. (4) Increases with increase in surface area 15. A colloidal solution is subjected to an electrical field. The particles move towards anode. The coagulation of same sol is studied using NaCl, BaCl, and AlCl, solution. Their coagulating power should be: [AIIMS 2012] (1) NaCl > BaCl, > AlCl, (2) BaCl, > AlCl, > NaCl (3) AlCl, > BaCl, > NaCl (4) BaCl, > NaCl > AlCl,
 - A colloidal solution is subjected to an electrical field. The particles move towards anode. The coagulation of same sol is studied using NaCl, BaCl₂ and AlCl₃ solutions. Their coagulating power should be [AIIMS 2013]

 (1) NaCl > BaCl₃ > AlCl₃ (2) BaCl₂ > AlCl₃ > NaCl
 (3) AlCl₃ > BaCl₃ > NaCl
 (4) BaCl₃ > NaCl > AlCl₃
- **17.** Assertion :The relationis $\frac{x}{m} = k.p^{1/n}$ known as Freundlich adsorption isotherm, where x is the mass of gas adsorption by *m* grams of adsorbate, *p* is the equilibrium pressure,k and n are constants for given system and temperature.

Reason : When several substances have same value of $\frac{1}{n}$, the lines by which their adsorption isotherms can be represented will be meet at a point. [AIIMS 2013]

- (1) If both assertion and reason are true and reason is a correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not a correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.
- (5) If assertion is false but reason is true.

- 18. Under the influence of an electric field, the particles in a sol migrate towards cathode. The coagulation of the same sol is studied using NaCl, Na₂SO₄ and Na₃PO₄ solutions. Their coagulating values will be in the order
 - (1) NaCl > Na₂SO₄ > Na₃PO₄ (2) $Na_2SO_4 > Na_3PO_4 > NaCI$ (4) $Na_2SO_4 > NaCl > Na_3PO_4$ (3) $Na_3PO_4 > Na_2SO_4 > NaCl$

19. Assertion : Proteins, starch and rubber are lyophilic collides. **Reason :** They have strong interaction with the dispersion medium.

- (1) If both assertion and reason are true and reason is a correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not a correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.
- (5) If assertion is false but reason is true.
- 20. Which of the following curve best explains the freundlich adsorption isotherm ?

[AIIMS 2017]

[AIIMS 2018]

[AIIMS 2018]

[AIIMS 2016]



- 21. Which of following statement is incorrect.
 - (1) On prolonged dialysis colloid becomes stable
 - (2) AgNO₃ in excess KI forms negative colloid
 - (3) AgNO₃ in excess KI forms positive colloid
 - (4) Medicines work best in colloidal form because of greater surface area

22. Assertion : Fe(OH)₃ and As₂S₃ colloidal sol on mixing precipitates

- **Reason :** $Fe(OH)_3$ and As_2S_3 combine and form new composition precipitate.
- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.

23.	Removal of charge from	[AIIMS 2018]		
	(1) Peptizaiton	(2) Coagulation	(3) Dialysis	(4) Bredig arc method
24.	Water in oil (w/o), what	agent :	[AIIMS 2018]	
	(1) soap	(2) heavy metal	(3) gold	(4) none

25. Assertion : In O/W emulsion, soap is mixed Reason : Soap reduces surface tension

- (1) If both assertion and reason are true and reason is the correct explanation of assertion.
- (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
- (3) If assertion is true but reason is false.
- (4) If both assertion and reason are false.
- 26. Assertion : Gold sol first convert into red to blue than blue to red on heating. [AIIMS 2018]
 Reason : In gold sol extent of metallic bonding increases.
 - (1) If both assertion and reason are true and reason is the correct explanation of assertion.
 - (2) If both assertion and reason are true but reason is not the correct explanation of assertion.
 - (3) If assertion is true but reason is false.
 - (4) If both assertion and reason are false.

PART - III : JEE (MAIN) / AIEEE PROBLEMS (PREVIOUS YEARS)

- 1. Which one of the following characteristics is not correct for physical adsorption? [AIEEE 2003]
 - (1) Adsorption on solids is reversible
 - (2) Adsorption increases with increase in temperature
 - (3) Adsorption is spontaneous
 - (4) Both enthalpy and entropy of adsorption are negative.
- 2. The disperse phase in colloidal iron (III) hydroxide and colloidal gold is positively and negatively charged, respectively. Which of the following statements is NOT correct? [AIEEE 2005]
 - (1) Coagulation in both sols can be brought about by electrophoresis
 - (2) Mixing the sols has no effect
 - (3) Sodium sulphate solution causes coagulation in both sols
 - (4) Magnesium chloride solution coagulates, the gold sol more readily than the iron (III) hydroxide sol.
- 3. The volume of collodial particle V_c as compared to the volume of a solute particle in a true solution V_s could be : [AIEEE 2005]

(1) ~ 1 (2) ~
$$10^{23}$$
 (3) ~ 10^{-3} (4) ~ 10^{3}

4. In langmuir's model of adsorption of a gas on a solid surface :

(1) the rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered

- (2) the adsorption at a single site on the surface may involve multiple molecules at the same time
- (3) the mass of gas striking a given area of surface is proportional to the pressure of the gas
- (4) the mass of gas striking a given area of surface is independent of the pressure of the gas
- 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 powers is
 (1) C < B < D < A
 (2) A < C < B < D
 (3) B < D < A < C
 (4) D < A < C < B
 (4) D < A < C < B
 (5)
 (1) C < B < D < A
 (2) A < C < B < D
 (3) B < D < A < C
 (4) D < A < C < B
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- 6. Which of the following statements is incorrect regarding physiosorptions ? [AIEEE 2009, 4/144]
 - (1) More easily liquefiable gases are adsorbed readily.
 - (2) Under high pressure it results into multi molecular layer on adsorbent surface.
 - (3) Enthalpy of adsorption $(\Delta H_{adsorption})$ is low and positive.
 - (4) It occurs because of van der Waal's forces.

[AIEEE 2006]

7.	According to Freundlich adsorption isotherm which of the following is correct? [AIEEE 2012, 4/1								
	(1) $\frac{x}{m} \propto p^{0}$	(2) -	$\frac{x}{m} \propto p^{1}$						
	(3) $\frac{x}{m} \propto p^{1/n}$	(4) A	Il the above are correct for	different ranges of pressure					
8.	The coagulating power in the order :	of electrolytes having	ions Na ⁺ , Al ³⁺ and Ba ²⁺ for arsenic sulphide sol increases [JEE(Mains) 2013, 4/120]						
	(1) Al³⁺ < Ba²⁺ < Na⁺	(2) Na ⁺ < Ba ²⁺ < Al ³⁺	(3) Ba²⁺ < Na⁺ < Al³⁺	(4) Al³⁺ < Na⁺ < Ba²⁺					
9.	3 gram of activated cha hour it was filtered and adsorbed (per gram of o (1) 18 mg	arocoal was added to the strength of the fi charcoal) is : (2) 36 mg	d to 50 mL of acetic acid solution (0.06N) in a flask. After a ne fitrate was found to be 0.042 N. The amount of acetic aci [JEE(Mains) 2015, 4/120]						
40		(2) 00 mg	(0) +2 mg						
10.	Match the catalysts to the Catalysts to the Catalyst	ne correct processes : Process		[JEE(Mains) 2015, 4/120]					
	(A) TiCl ₃	(i) Wacker p	rocess						
	(B) PdCl ₂	(ii) Ziegler - I	Natta polymerization						
	(C) CuCl ₂	(iii) Contact p	process						
	(D) V_2O_5	(iv) Deacon's	sprocess						
	(1) (A) - (iii), (B) - (ii), ((3) (A) - (ii), (B) - (iii), (C) - (iv), (D) - (i) C) - (iv), (D) - (i)	(2) (A) - (ii), (B) - (i), (C) - (iv), (D) - (iii) (4) (A) - (iii), (B) - (i), (C) - (ii), (D) - (iv)						
11.	For a linear plot of log statements is correct? ((1) 1/n appears as the i (3) log (1/n) appears as	(x/m) versus log p in /k and n are constants ntercept s the intercept.	 a Freundlich adsorption isotherm, which of the following [JEE(Mains) 2016, 4/120] (2) Only 1/n appears as the slope. (4) Both k and 1/n appear in the slope term. 						
12.	 The Tyndall effect is observed only when following conditions are satisfied : [JEE(Mains) 2017, 4/12 (a) The diameter of the dispersed particles is much smaller than the wavelength of the light used. (b) The diameter of the dispersed particles 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 magnitude. (d) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude. 								
		(2) (a) and (c)	(3) (b) and (c)	(4) (a) and (u)					
13.	Haemoglobin and gold (1) negatively charged s (2) positively charged s (3) positively and negat (4) negatively and posit	spectively	[JEE(Mains) 2019, 4/120]						
14.	An example of solid sol (1) Butter	is: (2) Hair cream	(3) Paint	[JEE(Mains) 2019, 4/120] (4) Gem stones					
15.	K ₂ HgI ₄ is 40% ionised in	n aqueous solution. Th	ne value of its van't Hoff fac	ctor (i) is : [JEE(Mains) 2019, 4/1201					
	(1) 1.8	(2) 1.6	(3) 2.0	(4) 2.2					

Answers

F

						EXER	CISE	· 1					
SEC	FION (A))											
1.	(1)	2.	(2)	3.	(1)	4.	(2)	5.	(4)	6.	(3)	7.	(1)
SEC	FION (B))											
1.	(4)	2.	(3)	3.	(2)	4.	(4)	5.	(3)	6.	(4)	7.	(3)
8.	(1)												
SEC	FION (C))											
1.	(1)	2.	(3)	3.	(1)	4.	(2)	5.	(3)	6.	(3)	7.	(2)
8.	(4)	9.	(3)	10.	(3)	11.	(4)	12.	(3)				
SEC	FION (D))											
1.	(3)	2.	(1)	3.	(3)	4.	(4)	5.	(4)	6.	(2)	7.	(4)
SEC	ΓΙΟΝ (E)												
1.	(2)	2.	(3)	3.	(4)	4.	(3)						
						EXER		- 2					
1.	(4)	2.	(3)	3.	(1)	4.	(1)	5.	(3)	6.	(1)	7.	(4)
8.	(3)	9.	(4)	10.	(2)	11.	(2)	12.	(4)	13.	(2)	14.	(3)
15.	(4)	16.	(1)	17.	(4)	18.	(1)	19.	(3)	20.	(1)	21.	(1)
22.	(2)	23.	(2)	24.	(1)	25.	(1)	26.	(2)	27.	(4)	28.	(1)
29.	(3)	30.	(2)										
						EXER	CISE ·	- 3					
						P	ART-I						
1.	(2)	2.	(1)	3.	(1)	4.	(4)	5.	(4)	6.	(4)	7.	(2)
8.	(1)	9.	(3)	10.	(1)	11.	(2)	12.	(2)	13.	(4)	14.	(2)
15.	(3)	16.	(3)	17.	(2)	18.	(4)	19.	(3)	20.	(2)	21.	(1)
						PA	RT-II						
1	(1)	2	(1)	2	(1)	1	(2)	5	(3)	6	(4)	7	(2)
ו. פ	(1)	2. 0	(1)	3. 10	(1)	4. 11	(2)	J. 12	(3)	U. 13	(4)	1.	(2) (2)
0. 15	(1)	J. 16	(2) (3)	10.	(2) (3)	12	(Z) (1)	12.	(3)	20	(1)	1 4 . 21	(2)
10. 22	(3)	10. 22	(3)	24	(3)	10. 25	(1)	19. 26	(1)	20.	(4)	21.	(3)
22.	(3)	23.	(2)	24.	(1)	2J.		20.	(3)				
		-				PA		_				_	
1.	(2)	2.	(2)	3.	(4)	4.	(3)	5.	(2)	6.	(3)	7.	(4)
8.	(2)	9.	(1)	10.	(2)	11.	(2)	12.	(1)	13.	(3)	14.	(4)
15.	(1)												