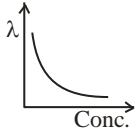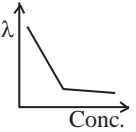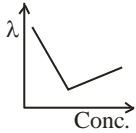# Surface Chemistry

1. Surface Tension & Surface Energy
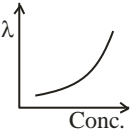
Q 1. Surface tension is due to
(A) Cohesive forces
(B) Adhesive forces
(C) Due to both type of forces
(D) None of these

Q 2. Surface energy is the
(A) Less energy that surface molecules have
(B) Energy that surface molecules have
(C) Have difference in energy between Surface molecule & molecule around it.
(D) None of these

Q 3. Water droplet is spherical is due to
(A) minimise surface energy
(B) minimise energy
(C) minimise surface tension
(D) None of these

Q 4. Which molecule is more stable
(A) surface molecule
(B) bulk molecule
(C) all molecules are equally stable
(D) None of these

Q 5. Surfactant molecule will have
(A) Hydrophylic portion towards the water & hydrophobic portion away from the water
(B) Hydrophobic portion towards the water & hydrophilic portion away from the water
(C) depends Hydrophylic portion & hydrophobic portion both towards the water
(D) Hydrophylic portion & hydrophobic portion away from the water

Q 6. Which of the following molecule will be NOT a surfactant molecule?
(A) $CH_3-(CH_2)_{18}-NH_2$
(B) $CH_3-(CH_2)_{18}-SO_3^-Na^+$
(C) $CH_3-(CH_2)_{18}-COO^-Na^+$
(D) $^+NH_3-(CH_2)_{18}-COO^-$

Q 7. Which of the following molecule is NOT a surfactant molecule? **[AIIMS 2003]**
(A) $CH_3-(CH_2)_{15}-N^+(Me)_3Br^-$
(B) $CH_3-(CH_2)_{14}-CH_2-NH_2$
(C) $CH_3-(CH_2)_{16}-CH_2-OSOO^-Na^+$
(D) $OCH-(CH_2)_{14}-COO^-Na^+$

Q 8. Which of the following molecule will form CMC in aqueous solution above a certain concentration? **[CBSE PMT 2005]**
(A) Urea
(B) Dodecyl Trimethyl Ammonium Chloride
(C) Pyridium Chloride
(D) Glucose

Q 9. In micelles, position of non-polar & polar parts are present as **[CBSE PMT 2002]**
(A) Polar at outer surface & Non-polar at inner surface
(B) Polar at inner surface & Non-polar at outer surface
(C) distributed all over the surface
(D) Present in the surface only

Q 10. Which of the following surfactant molecule has minimum value of CMC?
(A) $CH_3-(CH_2)_{10}-COO^-Na^+$
(B) $CH_3-(CH_2)_{13}-SO_3^-Na^+$
(C) $CH_3-(CH_2)_{16}-NMe_3^+Cl^-$
(D) $CH_3-(CH_2)_8-COO^-K^+$

Q 11. The surface tension (λ) vs concentration graph for surfactant molecule is
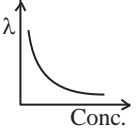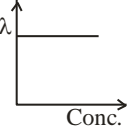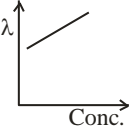
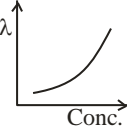Q 12. The correct graph for surface tension (λ) vs concentration of NaCl is .

Q 13. In surfactant molecules, hydrophilic part must be
(A) Ionic   (B) Cationic
(C) Anionic   (D) Polar

Q 14. Assertion(A): Detergent with low CMC are more commercial to use.

Reason(R): Cleaning action of detergents involves the formation of micelles. These are formed when the concentration of detergents becomes equal to CMC. **[NCERT Exampler]**

(A) Both A & R are correct & R is the correct explanation of A

(B) Both A & R are correct & R is not the correct explanation of A

(C) Assertion is True but Reason is false

(D) Both Assertion & Reason are false

2. Adsorption

Q 1. Adsorption is

(A) Exothermic process

(B) Endothermic process

(C) Neither exothermic nor endothermic

(D) can be of any type

Q 2. Which of the following is zero during adsorption?

(A) ΔG (B) ΔS

(C) ΔH (D) None of these

Q 3. Adsorption is accompanied by

(A) Increase in entropy of the system

(B) Decrease in enthalpy of the system

(C) Decrease in Gibbs free energy

(D) All of these

Q 4. At equilibrium position in the process of adsorption….. **[NCERT Exampler]**

(A) $\Delta H > 0$ (B) $\Delta H = T \Delta S$

(C) $\Delta H > T \Delta S$ (D) $\Delta H < T \Delta S$

Q 5. Which of the following is an example of adsorption? **[AIIMS 1997/NCERT Exampler]**

(A) Water on silica gel

(B) Water on Calcium chloride

(C) hydrogen on finely divide nickel

(D) Oxygen on metal surface

Q 6. When adsorption and absorption happens simultaneously then it is called

(A) Energy releases   (B) Energy absorbed

(C) No energy change   (D) Can be -ve or +ve

Q 7. The adsorption of a vapour on a clean surface is a spontaneous process because

(A) Change in the entropy of the process is highly positive

(B) Enthalpy change is high positive

(C) Change in entropy zero

(D) Change in enthalpy is highly negative

Q 8. Which of the following gas molecule has maximum value of enthalpy of physic-sorption?

(A) C_2H_6 (B) Ne

(C) H_2O (D) H_2

Q 9. Which of the following is characteristics is not correct for physical adsorption? **[AIEEE 2003]**

(A) Adsorption on solid is reversible

(B) Adsorption increases with increase in temperature

(C) Adsorption is spontaneous

(D) Both enthalpy & entropy of adsorption are nagative

Q 10. For Physisorption, heat of adsorption is generally in the range of

(A) 20 – 80 KJ/mol   (B) 80 – 120 KJ/mol

(C) 100 – 150 KJ/mol   (D) 300 – 400 KJ/mol

Q 11. Which of the following statement is incorrect regarding physisorption?

(A) It occurs because of van der waal's force

(B) More easily liquefiable gases are adsorbed readily

(C) under high pressure it results into multimolecular layer on adsorbent surface

(D) $\Delta H_{adsorption}$ is low & positive

Q 12. Which of the following condition is more favorable for physical adsorption?

(A) High P & high T   (B) Low P & Low T

(C) Low P & high T   (D) High P & low T

Q 13. Which of the following is not a characteristics of chemisorptions?

(A) Adsorption is irreversible

(B) ΔH is in order of 900 KJ

(C) Adsorption is specific

(D) Adsorption increases with increase in surface area

Q 14. Which of the following statements are correct?

(A) Physical adsorption is multilayer, non-directional and non specific

(B)   Chemical adsorption first increases and then decreases with increase in temperature

(C)   In some cases, solvent may be adsorbed in preference to the solute on the surface of the adsorbent

(D)   As a result of adsorption, there is increase in surface area

Q 15.   Which of the following is/are incorrect about chemisorptions?

(A)   multilayer adsorption

(B)   reversible in nature

(C)   Strong adsorption by free molecules

(D)   Exothermic in nature

Q 16.   Assertion(A): NH_3 adsorbs more readily over activated charcoal than CO_2

Reason(R): NH3 is non–Ploar   **[AIIMS 2001]**

(A)   Both A & R are correct & R is the correct explanation of A

(B)   Both A & R are correct & R is not the correct explanation of A

(C)   Assertion is True but Reason is false

(D)   Both Assertion & Reason are false

Q 17.   On the basis of data given below, predict which of the following gases show least adsorption on a given amount of charcoal?   **[NCERT Exampler]**

Gas	CO_2	SO_2	CH_4	H_2
Critical T(K)	304	630	190	33

(A) CO_2 (B) SO_2

(C) CH_4 (D) H_2

Q 18.   Physical adsorption of a gaseous species may change into chemical adsorption with

[NCERT Exampler]

(A)   Decrease in temperature

(B)   Increase in temperature

(C)   Increase in surface area of adsorbent

(D)   Decrease in surface area of adsorbent

3. Factors Affecting Adsorption

Q 1.   Which plot is correct for adsorption isobar of chemisorption?
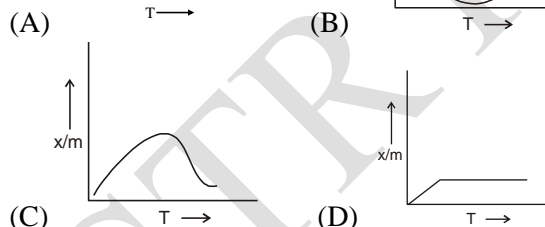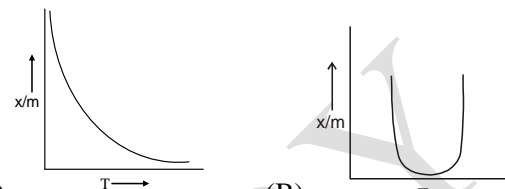
(A)   (B)

(C)   (D)

Q 2.   The Freundlich adsorption isotherm is valid for

(A) all types of adsorption

(B) only for physical adsorption

(C) only for chemisorption

(D) Physorption limited to only one layer

Q 3.   Which represent equation for Frendulich adsorption isotherm?

(A) $\dfrac{x}{m} = K(P)^{1/n}$, where x is amount of gas adsorbed on masss 'm' at pressure P

(B) $\log \dfrac{x}{m} = \log K + \dfrac{1}{n} \log P$

(C) $\dfrac{x}{m} = KP$ at low pressure

& $\dfrac{x}{m} = K$ at high pressure

(D)   All of these

Q 4.   In Frendulich adsorption isotherm value of 1/n is

[CBSE PMT 2012]

(A)   Between 0 to 1 in all cases

(B)   Between 2 & 4 in all cases

(C)   1 in case of physical adsorption

(D)   1 in case of chemical adsorption

Q 5.   Frendulich adsorption isotherm gives straight line on plotting

(A) $\dfrac{x}{m}$ vs. P   (B) $\log \dfrac{x}{m}$ vs. P

(C) $\log \dfrac{x}{m}$ vs. log P   (D) $\dfrac{x}{m}$ vs. $\dfrac{1}{P}$

Q 6.   Adsorption of solute from the solution follows

principle similar like
- (A) Freundlich adsorption isotherm
- (B) Freundlich adsorption isobar
- (C) Freundlich adsorption isochors
- (D) None of these

Q 7. In Langmuir model of adsorption of a gas on a solid surface. **[AIEEE 2006]**

(A) The rate of dissociation of adsorbed molecules from the surface does not happened on the surface covered

(B) The adsorption at a single site on the surface may involve multiple layer at the same time

(C) The mass of gas striking a given area is proportional to the pressure of the gas

(D) The mass of gas striking a given area is independent of the pressure of the gas

Q 8. According to Langmuir adsorption isotherm, when the pressure of a gas is very large, the absorption is

(A) directly proportional to pressure

(B) inversely proportional to pressure

(C) directly proportional to the square of pressure

(D) independent of pressure

**Q 9.** If x/m is the mass of adsorbate adsorbed per unit mass of adsorbent, P is the pressure of the adsorbate gas, a & b are constants, which of the following does not represent Langmuir adsorption isotherm?

(A) $\log\left(\dfrac{x}{m}\right) = \log\left(\dfrac{a}{b}\right) + \dfrac{1}{a}\log P$

(B) $\dfrac{x}{m} = \dfrac{aP}{1 + bP}$

(C) $\dfrac{x}{m} = \dfrac{a}{b}$ (when the pressure is High)

(D) $\dfrac{x}{m} = a.P$ (when the pressure is Low)

Q 10. 3 g of activated charcoal was added to 50 mL of acetic acid solution (0.06 N) in a flask. After an hour it was filtered and the strength of the filtrate was found to be 0.042 N. The amount of acetic acid adsorbed (per g of charcoal) is

[JEE Main 2015]

(A) 36 mg (B) 42 mg

(C) 54 mg (D) 18 mg

Q 11. 1 gm of charcoals adsorbed 100 ml 0.5 M CH_3COOH to form a monolayer, & it decreases molarity of CH_3COOH to 0.49. Calculate the surface area of the charcoal by occupied by each molecule of acetic acid. Surface area of charcoal $= 3\times10^2\,m^2 / g$ **[JEE Adv. 2003]**

(A) $5\times10^{-19}\,m^2$ (B) $5\times10^{-20}\,m^2$

(C) $5\times10^{-18}\,m^2$ (D) None of these

Q 12. The correct statement(s) pertaining to the adsorption of a gas on a solid surface is/are

[JEE Adv. 2011]

(A) Adsorption is always exothermic

(B) physisorption may transform into chemisorptions at high pressure

(C) physiorption increases with increasing temperature but chemisorptions decreases with increasing temperature.

(D) chemisorption is more exothermic than physisoprtion, however it is very slow due to higher energy of activation.

Q 13. 20% of surface sites are occupied by N_2 molecules. The density of surface site is 6.023×10^{14} cm^{-2} & total surface area is 1000 cm². The catalyst is heated to 300 K while N_2 is completely desorbed into a pressure of 0.001 atm and volume of 2.46 cm³. Find the no of active site occupied by each of N_2 atom.

[JEE Adv. 2005]

(A) 1 (B) 2

(C) 3 (D) 4

Q 14. The given graph/data I, II, III, IV represents general trends observed for different physisorption and chemisorption process under mild conditions of temperature & pressure. Which of the following choice about I, II, III & IV is/are correct? **[JEE Adv. 2012]**

(I)   (II)
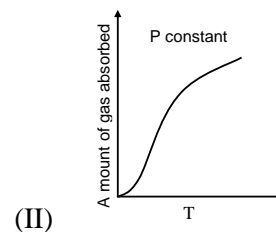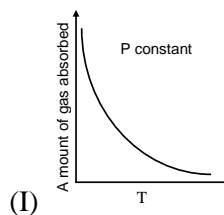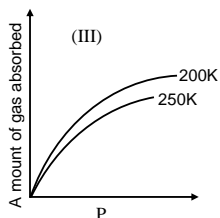
(III)

(IV)
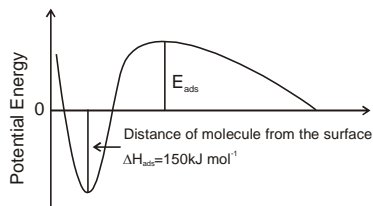
(A) I is physisortion & II is chemisorption

(B) I is physisoprtion & III is chemisorption

(C) IV is chemisorption & II is chemisorption

(D) IV is chemisorptions & III is chemisorption

4. Catalysis

Q 1. Which is false for a catalyst?

(A) A catalyst can initiate a reaction

(B) It does not alter the position of equilibrium in a reversible reaction

(C) A catalyst remains unchanged in quality and composition at the end of reaction

(D) Catalysts are sometimes very specific in reaction

Q 2. Negative catalysis in a reaction

(A) Decreases activation energy

(B) Increases activation energy

(C) Increases rate of reaction

(D) Does not affect activation energy

Q 3. Induced catalyst are the one

(A) A substance which cause a particular reaction when it doesn't happen without that substance.

(B) A reaction which can cause other reaction to happen when other reaction does not happen when it is done only.

(C) A substance which produces a substance after reaction which can catalyse the reaction

itself.

(D) None of these

Q 4. In which of following catalysis reaction is initially slow and becomes faster after sometime

(A) Positive Catalysis   (B) Auto Catalysis

(C) Homogeneous catalysis (D) Induced catalysis

Q 5. Intermediate compound formation theory is given for

(A) Positive Catalysis   (B) Negative Catalysis

(C) Homogeneous catalysis

(D) Hetrogeneous catalysis

Q 6. How many steps involves in Adsorption theory for catalysis?

(A)   2   (B)   4

(C)   5   (D)   None of these

Q 7. According to the adsorption theory of catalysis, the speed of the reaction increases because

[CBSE PMT 2003]

(A) Adsorption produces heat which increases the speed of reaction

(B) Adsorption lowers the activation energy of the reaction

(C) the concentration of reactant molecules at the active centres of the catalyst becomes high due to adsorption

(D) in the process of adsorption, the activation energy of the molecules becomes large

Q 8. Theory of different catalysis are

(A) Adsorption theory

(B) Intermediate compound formation theory

(C) Lock & Key model

(D) All of these

Q 9. Which of the following process does not occur at the interface of phases?   **[NCERT Exampler]**

(A) crystallisation   (B) Hetrogeneous catalysis

(C) Corrosion   (D) Homogeneous catalysis

Q 10. Activity of catalyst depends on

(A) Chemisorption   (B) Physisorption

(C) option A or B in different condition

(D) None of these

Q 11. For activity of catalyst to be effective, the strength of chemisorptions should be of

(A) weak Nature   (B) Strong nature

(C) Moderate Nature

(D) Changes in different cases

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Q 12. Which of the following is an example of shape selective catalysis?
(A) Enzyme catalysis
(B) Zeolite catalysis
(C) Homogeneous catalysis
(D) Hetrogeneous catalysis

Q 13. Enzyme catalysis does not depends on
(A) pH (B) Temperature
(C) Pressure (D) Activator & Poison

Q 14. In case of enzyme catalysis, Promoter is called
(A) Co-promoter (B) Co-enzyme
(C) Co-worker (D) None of these

Q 15. Lock & Key model for enzyme catalysis involves
(A) 2 steps (B) 3 steps
(C) 4 steps (D) 5 steps

5. Type of Collodial Solution

Q 1. Milk is an example of
(A) Colloids (B) Suspension
(C) True solution (D) None of these

Q 2. The size of the colloidal particles is in between
(A) $10^{-7} - 10^{-9}$ cm (B) $10^{-9} - 10^{-11}$ cm
(C) $10^{-5} - 10^{-7}$ cm (D) $10^{-2} - 10^{-3}$ cm

Q 3. The volume of a colloidal particles, Vc as compared to the volume of a solute particle in a true solution Vs, could be **[AIEEE 2005]**
(A) $\dfrac{Vc}{Vs} \approx 10^{23}$ (B) $\dfrac{Vc}{Vs} \approx 1$
(C) $\dfrac{Vc}{Vs} \approx 10^{3}$ (D) $\dfrac{Vc}{Vs} \approx 10^{-3}$

Q 4. Fog is an example of
(A) Foam (B) Aerosol
(C) Gel (D) Emulsion

Q 5. Smoke is an example of
(A) Gas dispersed in liquid
(B) Gas dispersed in solid
(C) Solid dispersed in gas
(D) Gas dispersed in gas

Q 6. Which of the following is correctly matched?
(A) Emulsion – Curd (B) Foam – Mist
(C) Aerosol – Smoke (D) Solid Sol – Cake

Q 7. Whipped cream is an example of a
(A) Sol (B) Gel
(C) Foam (D) Aerosol

Q 8. The colloidal solution consisting of a liquid in a solid adsorbent is termed as
(A) Aerosol (B) Foam
(C) Emulsion (D) Gel

Q 9. Butter is a colloid containing
(A) fat dispersed in water (B) fat dispersed in oil
(C) water dispersed in fat (D) None of these

Q 10. If water is the dispersion medium then the sol formed is called
(A) Aqua sol (B) Hydrosol
(C) Aerosol (D) Both A & B

Q 11. The lyophilic colloid among the following is
(A) Blood (B) Gold Sol
(C) $Fe(OH)_3$ sol (D) Starch

Q 12. Which of the following statements is correct?
(A) Lyophobic colloids do not easily coagulate on adding electrolytes
(B) Lyophobic colloids are reversible in nature
(C) Lyophilic colloids are irreversible in nature
(D) Lyophobic colloids are easily coagulated by electrolytes

Q 13. Hydrophilic sols are stable due to
(A) Small size of the particle
(B) Large size of the particle
(C) Charge on the particle
(D) Attractive interaction between colloidal particles and dispersion medium

Q 14. The stability of the dispersed phase in a lyophobic colloids is due to
(A) High viscosity of the medium
(B) Formation of electrical layer between2 phases
(C) High surface tension of solution
(D) None of the options are correct

Q 15. Surface tension of lyophilic tension is ……..than that of the medium
(A) Equal (B) Less
(C) More (D) Twice

Q 16. Lyophilic sols are more stable than lyophobic sols because
(A) the colloidal particles have positive charge
(B) the colloidal particles have negative charge
(C) the colloidal particles are solvated
(D) there is strong repulsion between the negatively charged colloidal particles

Q 17. Which of the following statements is wrong about lyophobic sols?
- (A) They exhibit the Tyndall effect (Scattering of light)
- (B) They are not prepared by direct mixing
- (C) They commonly form gels
- (D) They undergo electrophoresis and electroosmosis

6. Preparation of Colloidal Solution

Q 1. Which of the following is an example of associated colloid?
- (A) Polyethylene sol
- (B) Rubber sol
- (C) PVC sol
- (D) Soap sol

Q 2. Which of the following is an example of macromolecular colloids?
- (A) Proteins
- (B) Sulphur
- (C) Silver
- (D) Detergent

Q 3. Which of the following gives colloidial solution?
- (A) $Cu + HgCl_2 \rightarrow CuCl_2 + Hg$
- (B) $2HNO_3 + 3H_2S \rightarrow 3S + 4H_2O + 2NO$
- (C) $2Mg + CO_2 \rightarrow 2MgO + C$
- (D) $Cu + CuCl_2 \rightarrow Cu_2Cl_2$

Q 4. Which of the following reaction is not an example of chemical method of condensation process of colloids formation?
- (A) Oxidation
- (B) Reduction
- (C) Hydrolysis
- (D) Neutralisation

Q 5. Which of the following process is present in Physical method of condensation process?
- (A) By heating
- (B) By adding electrolyte
- (C) By exchanging solvent
- (D) None of these

Q 6. Which of the following molecules is most suitable to disperse benzene in water?

[AIIMS 2005]
- (A) $CH_3–(CH_2)_9–COO^-Na^+$
- (B) $^+Na^-OOC–(CH_2)_8–COO^-Na^+$
- (C) $CH_3–(CH_2)_8–PhCH_3$
- (D) $Cl–(CH_2)_8–Ph$

Q 7. In mechanical dispersion, suspension is added to colloidial mill with KOH. In this process, KOH act as
- (A) Electrolyte
- (B) stabliser
- (C) Solvent
- (D) Dispersion Medium

Q 8. Which of the following metallic sols cannot be prepared by Bredig's arc method?
- (A) Gold
- (B) Silver
- (C) platinum
- (D) Sodium

Q 9. Peptisation denotes
- (A) Digestion of food
- (B) Hydrolysis of proteins
- (C) Breaking & dispersion into colloidal state
- (D) None of these

Q 10. In the preparation of AgI sol, excess of KI solution is added to $AgNO_3$ solution. The charge on the colloidal particles would be
- (A) Positive
- (B) Negative
- (C) No Charge
- (D) Unpredicable

Q 11. Colloidal solution of Arsenic Sulphide can be prepared by
- (A) Electro dispersion Method
- (B) peptisation
- (C) Double Decompostion
- (D) Hydrolysis

Q 12. Colloidal solution is not purified by
- (A) Dialysis
- (B) Electrodialysis
- (C) Electrophoresis
- (D) Ultrafilteration

Q 13. Colloidial Particles can pass through
- (A) Filter Paper
- (B) Ultra Filter Paper
- (C) SPM
- (D) All of these

Q 14. **Assertion(A):** An ordinary filter paper impregnated with colloidal solution stops the flow of colloidal particles.
Reason(R): Pore size of the filter paper becomes more than size of colloidal particles
.   **[NCERT Exampler]**
- (A) Both A & R are correct & R is the correct explanation of A
- (B) Both A & R are correct & R is not the correct explanation of A
- (C) Assertion is True but Reason is false
- (D) Both Assertion & Reason are false

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7. Properties of Collodial Solution

Q 1. The value of Colligative properties of colloidal solution are of smaller value than those of true solution of same concentration because of colloidal particles   **[NCERT Exampler]**
(A) exhibit large surface area
(B) remain suspended in the dispersion medium
(C) form lyophilic colloids
(D) are comparatively less in number

Q 2. The sky looks blue due to
(A)   Dispersion   (B)   Reflection
(C)   Transmission   (D)   Scattering

Q 3. The colour of the colloidal particles of gold obtained by different methods differ because of
(A)   Variable valency of gold
(B)   Different concentration of gold particles
(C)   Different types of impurities
(D)   Different diameter of colloidal particles

Q 4. When a colloidal solution is observed under an ultra microscope, we can see
(A)   Light scattered by colloidal particles
(B)   Size of the particles
(C)   Shape of the particles
(D)   Relative size

Q 5. Tyndall effect is due to
(A) Reflection of light   (B) Scattering of light
(C) Absorption of Light (D) Adsorption of Light

Q 6. Tyndall effect is observed only when following conditions are satisfied   **[JEE Main 2017]**
(I) The diameter of dispersed particles is much smaller than the wavelength of the light used
(II) The diameter of dispersed particles is not much smaller than wavelength of the light used
(III) The refractive indices of the dispersed phase and dispersion medium are almost similar value
(IV) The refractive indices of the dispersed phase and dispersion medium differ greatly in value
(A)   (II) & (III)   (B)   (I) & (IV)
(C)   (II) & (IV)   (D)   (I) & (III)

Q 7. Which of the following will show tyndall effect?
          [NCERT Exampler]
(A) Aqs solution of Soap below CMC
(B) Aqs solution of Soap above CMC
(C) Aqs solution of Sodium Chloride
(D) Aqs solution of Sugar

Q 8. The Brownian movement is due to

(A) Temperature fluctuation within the liquid Phase
(B) Attraction & repulsion between Charges on the colloidal Particles
(C) Impact of molecules of the dispersion medium on the colloidal particles
(D) Convective current

Q 9. Which of the following process is not responsible for the presence of electric charge on the sol particles?   **[AIIMS 2013]**
(A) Electron capture by sol particles
(B) Absorption of ionic species from Solution
(C) Formation of Helmholtz electrical double layer
(D) Adsorption of ionic species from solution

Q 10. Migration of colloidal particles under the effect of an electric field is known as
(A) Electroosmosis   (B) Electrophoresis
(C) Elctrodialysis   (D) None of these

Q 11. Colloidal particles in soap sol carry
(A) Negative charge   (B) Positive charge
(C) No Charge   (D) Either +ve or –ve charge

Q 12. Which of the following give +vely charged sol?
(A) Gold sol   (B) Metal sulphide sol
(C) Ferric hydroxide sol (D) An acidic dye

Q 13. Which of the following statements are correct?
(I) On the application of an electric field, the particles of a lyophobic sol may move in either direction or not move at all
(II) Surface tension of lyophobic sols are similar to the dispersion medium
(III) Electo-osmosis is the movement of particles of dispersion medium under the effect of an Electric field.
(A)   I, II & III   (B)   I & III
(C)   II & III   (D)   I & II

Q 14. A freshly prepared $Fe(OH)_3$ precipitate is peptised by adding $FeCl_3$ solution. The charge on the colloidal particle is due to the preferential adsorption of
(A) Cl^- ion   (B) Fe^{3+} ion
(C) OH^- ion   (D)   None of these

Q 15. A negative charged suspension of clay in water will need for precipitation, minimum amount of
(A) Aluminum chloride (B) Potassium sulphate
(C) Sodium hydroxide   (D) HCl

Q 16. Which of the following is the most effective in coagulation of gold sol?
(A) Sodium nitrate   (B) Magnesium chloride
(C) Na_3PO_4 (D) $K_4[Fe(CN)_6]$

Q 17. Focculation value is expressed in terms of
(A)   milimoles/liter   (B)   moles/liter
(C)   grams/liter   (D)   mole/mililiter

Q 18. In coagulation of As_2S_3 solution, the flocculating powers of the given ions are such that
(A) $Na^+ > Ba^{2+} > Al^{3+}$ (B) $Al^{3+} > Ba^{2+} > Na^+$
(C) $Cl^- > SO_4^{2-} > PO_4^{3-}$ (D) $PO_4^{3-} > SO_4^{2-} > Cl^-$

Q 19. In coagulating a negatively charged lyophobic colloid, very little amount of $AlCl_3$ is required in comparison to amount of NaCl required, because
(A) The molecular mass of $AlCl_3$ is more than that of NaCl
(B) The ionic charge of Al^{3+} is 3 times that of Na^+
(C) Al^{3+} ion is slightly smaller than Na^+ in size
(D) The charge density of Al^{3+} ion is more than that of Na^+

Q 20. Among the electrolytes Na_2SO_4, $CaCl_2$, $Al_2(SO_4)_3$ and NH_4Cl, the most effective coagulating agent for Sb_2S_3 sol is   **[JEE Main 2009]**
(A) Na_2SO_4 (B) $CaCl_2$
(C) $Al_2(SO_4)_3$ (D) NH_4Cl

Q 21. The amount of electrolytes required to coagulate a given amount of AgI colloidal solution (–ve Charge) will be in order   **[AIIMS 2014]**
(A) $NaNO_3 > Al(NO_3)_3 > Ba(NO_3)_2$
(B) $Al(NO_3)_3 > Ba(NO_3)_2 > NaNO_3$
(C) $Al(NO_3)_3 > NaNO_3 > Ba(NO_3)_2$
(D) $NaNO_3 > Ba(NO_3)_2 > Al(NO_3)_3$

Q 22. The coagulation value in millimoles er liter of the electrolytes used for the coagulation of As_2S_3 are given below   **[NEET 2016 Phase 2]**
I. NaCl=52   II. $BaCl_2$=0.69   III. $MgSO_4$=0.22
(A)   I > II > III   (B)   II > I > III
(C)   III > II > I   (D)   III > I > II

8. Protective Colloids & Emulsion

Q 1. Method by which lyophobic sol can be protected
                 [NCERT Exampler]
(A) By addition of oppositely charged sol
(B) By addition of an electroltyte
(C) By addition of lyophilic sol
(D) By boiling

Q 2. The Gold number of four protective colloids O, P, Q and R are 0.005, 0.01, 0.1 and 0.5 respectively. The decreasing order of their protective power is
(A)   R, Q, P, O   (B)   O, P, Q, R
(C)   P, Q, R, O   (D)   Q, R, O, P

Q 3. Gelatin protects
(A)   Gold Sol   (B) As_2S_3 Sol
(C) $Fe(OH)_3$ Sol   (D)   All of these

Q 4. Protective power of lyophilic sol is
(A)   dependent on size of colloidial particles
(B)   expressed in terms of gold number
(C)   expressed in x/m
(D)   Directly proportional to magnitude of charge on it

Q 5. The number of millimoles of sodium chloride and Magnesium chloride required to Coagulate a litre each of two sols X and Y are as follows:

	X	Y
NaCl	51	46
$MgCl_2$	71	23

Which of the following would not be reasonable value to expect for the amount of the other salt required to cause precipitation?
(A) X is precipitated by 0.01 millimoles of $AlCl_3$
(B) Y is precipitated by 0.3 millimoles of $AlCl_3$
(C) X is precipitated by 25 mlimoles of Na_2SO_4
(D) Y is precipitated by 0.6 milimoles of $MgSO_4$

Q 6. Gelatin is mostly used in making ice-cream in order to
(A) Prevent forming the colloidal sol
(B) Enrich the fragrance
(C) Prevent crystallization & stablises the mix
(D) Modify the state

Q 7. The Cottrell precipitator is used to
(A) Neutralise charge on carbon particles in smoke
(B) Coagulate carbon atoms of smoke
(C) Bringing cataphoresis in carbon particles
(D) All of these

Q 8.   Alum helps in purifying water by **[AIEEE 2002]**
(A)   Forming Si-complex with Clay Particle
(B)   Sulphate part which combine with dirt and removes it
(C)   Aluminium coagulates the mud particles
(D)   Making mud water soluble

Q 9.   Milk is an emulsion of the type
(A)   O/W type   (B)   W/O type

(C)   W/W type   (D)   O/O type

Q 10.   If oil is miscible in emulsion, then emulsion is
(A)   oil in water   (B)   water in oil
(C)   oil in oil   (D)   Water in water

Q 11.   Which of the following species act as emulsifying agent/emulsifier.
(A) Soap or detergent   (B) Casein (Proteins)
(C) Sulphate of Fe, Cu, Ni   (D) All of these

Answer Key

1. Surface Tension & Surface Energy

(1). C	(2). B	(3). B
(4). B	(5). A	(6). D
(7). B	(8). B	(9). A
(10). C	(11). B	(12). B
(13). D	(14). A	

2. Adsorption

(1). A	(2). D	(3). D
(4). B	(5). B	(6). A
(7). D	(8). C	(9). B
(10). A	(11). D	(12). D
(13). B	(14). A, B, C	(15). A, B
(16). D	(17). D	(18). B

3. Factors Affecting Adsorption

(1). C	(2). D	(3). D
(4). A	(5). C	(6). A
(7). C	(8). B	(9). A
(10). D	(11). A	(12). A, B, D
(13). B	(14). A, C	

4. Catalysis

(1). C	(2). B	(3). C
(4). B	(5). C	(6). C
(7). B	(8). D	(9). D
(10). A	(11). C	(12). B
(13). C	(14). B	(15). B

5. Type of Collodial Solution

(1). A	(2). C	(3). C
(4). B	(5). C	(6). C
(7). C	(8). D	(9). A
(10). B	(11). D	(12). C
(13). D	(14). B	(15). B
(16). C	(17). C	

6. Preparation of Colloidal Solution

(1). D	(2). A	(3). B
(4). D	(5). C	(6). C
(7). B	(8). B	(9). C
(10). B	(11). C	(12). C
(13). A	(14). C	

7. Properties of Collodial Solution

(1). D	(2). D	(3). D
(4). A	(5). B	(6). C
(7). B	(8). C	(9). D
(10). B	(11). A	(12). C
(13). C	(14). B	(15). A
(16). B	(17). A	(18). B
(19). B	(20). C	(21). B
(22). C		

8. Protective Colloids & Emulsion

(1). C	(2). B	(3). D
(4).B	(5). B	(6). C
(7). D	(8). C	(9). A
(10). B	(11). D	