

EXERCISE - O

Adsorption

- Which of the following characteristics is not correct for physical adsorption :-
 (A) Adsorption is spontaneous at suitable conditions
 (B) It is not specific in nature
 (C) It is reversible in nature
 (D) Degree of adsorption increases with temperature
CSF080
- Adsorption is multilayer in case of
 (A) Physical adsorption (B) Chemical adsorption
 (C) Both (A) and (B) (D) None of these
CSF081
- Which one of the following is applicable to chemisorption-
 (A) It is Irreversible (B) Heat of Adsorption is Negative
 (C) It forms unimolecular layer (D) All
CSF082
- Which one of the following is not applicable to chemisorption :-
 (A) Heat of chemisorption is negative (B) It is reversible
 (C) It forms mono molecular layers (D) None
CSF083
- Adsorption of gases on solid surface is generally exothermic because :-
 (A) Free energy increases
 (B) Entropy decreases
 (C) Entropy increases
 (D) Interaction developed between gas and solid particles
CSF084
- Which of the following is true in respect of adsorption ?
 (A) $\Delta H > 0$ $\Delta S < 0$ $\Delta G < 0$ (B) $\Delta H < 0$ $\Delta S < 0$ $\Delta G < 0$
 (C) $\Delta H > 0$ $\Delta S > 0$ $\Delta G > 0$ (D) $\Delta H > 0$ $\Delta S > 0$ $\Delta G < 0$
CSF085
- These are certain properties related to physical adsorption ?
 I. Reversible.
 II. formation of unimolecular layer.
 III. occurs at low temperature and decreases with increasing temperature.
 IV. low heat of adsorption.
 Which of the above properties are for physical adsorption ?
 (A) I, II, III (B) I, III, IV (C) II, III, IV (D) I, III
CSF086
- According to Freundlich on increasing the pressure, change in extent of adsorption with respect to pressure (at low pressure range) -
 (A) Constant (B) Increase linearly
 (C) Increase but not linearly (D) Decreases
CSF087

9. Graph between $\log\left(\frac{x}{m}\right)$ and $\log P$ is a straight line inclined at an angle of 45° . When pressure of 0.5 atm and $\log k = 0.699$, amount of solute adsorbed for gram of adsorbent will be :
 (A) 1 gm / g adsorbent (B) 1.5 gm / g adsorbent
 (C) 2.5 gm / g adsorbent (D) 0.25 gm / g adsorbent

CSF088

10. Freundlich adsorption isotherm gives a straight line on plotting :-

- (A) $\frac{x}{m}$ vs P (B) $\log \frac{x}{m}$ vs P (C) $\log \frac{x}{m}$ vs $\log P$ (D) $\frac{x}{m}$ vs $\frac{1}{P}$

CSF089

Catalysis

11. The process which is catalysed by one of the products is called
 (A) acid-base catalysis (B) autocatalysis
 (C) negative catalysis (D) homogeneous catalysis

CSF090

12. Which reaction show the use of heterogenous catalyst

- (A) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightarrow{\text{NO}(\text{g})} 2\text{SO}_3(\text{g})$
 (B) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightarrow{\text{Pt}(\text{s})} 2\text{SO}_3(\text{g})$
 (C) $\text{CH}_3\text{COOCH}_3(\text{l}) + \text{H}_2\text{O}(\text{l}) \xrightarrow{\text{HCl}(\text{l})} \text{CH}_3\text{COOH}(\text{aq.}) + \text{CH}_3\text{OH}(\text{aq.})$
 (D) All of the above

CSF091

13. Promoters and Poison are the substance use in chemical reaction which

- (A) Enhance and decrease the activity of catalyst respectively
 (B) Decrease and enhance the activity of catalyst respectively
 (C) Do not have any effect on catalyst
 (D) Can be used in place of catalyst whenever required

CSF092

14. Catalyst used in hydrogen of Vegetable oil into Vegetable ghee is :

- (A) Ni (B) Fe (C) Pd (D) Pt

CSF093

15. Which of the following catalysts is used in contact process ?

- (A) V_2O_5 (B) Fe (C) Co (D) Ni

CSF094

- 16.

List-I		List-II	
(P)	Inversion of cane sugar	(1)	Diastase
(Q)	Conversion of starch into maltose	(2)	Lactor bacilli enzyme
(R)	Conversion of glucose into ethyle alcohol	(3)	Invertase
(S)	Conversion of milk into curd	(4)	Zymase

- (A) P-3; Q-4; R-1; S-2 (B) P-3; Q-4; R-2; S-1
 (C) P-3; Q-1; R-4; S-2 (D) P-2; Q-4; R-1; S-2

CSF095

17. When $H_{2(gas)}$ gets adsorbed on transition metals, metal hydride formation takes place. Which of the options will not be correct on the basis of above observation?
- (A) Greater the surface area of transition metals greater will be the extent of adsorption.
 (B) The enthalpy change involved will be in the range of 20-40 kJ/mole.
 (C) The extent of adsorption first increases with increase in temperature then after decrease.
 (D) The adsorption will be irreversible in nature.

CSF096

18. 112 cm^3 hydrogen gas is adsorbed at the surface of 5gm Palladium at 273 K and 2 atm. If the effective surface area of each hydrogen molecule is 0.4 nm^2 , then the specific surface area of Palladium is :
- (A) $2.4 \times 10^6 \text{ m}^2/\text{gm}$ (B) $4.8 \times 10^6 \text{ cm}^2/\text{gm}$
 (C) $1.2 \times 10^4 \text{ cm}^2/\text{gm}$ (D) $1.2 \times 10^4 \text{ m}^2/\text{gm}$

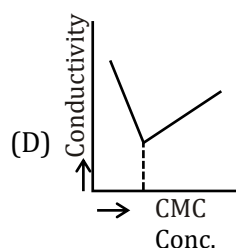
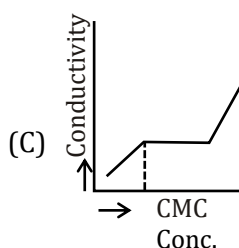
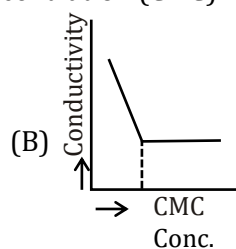
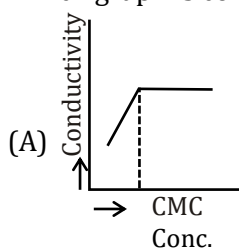
CSF097

19. In vessel O_2 gas undergoes physisorption on adsorbent surface causing its partial pressure to decrease from 6 atm to 'P' atm in a 8.21 L vessel at 500K. If total number of sites is 2×10^{23} on adsorbent surface and every site accommodates effectively three O_2 molecules find P(atm).
 $[N_A = 6 \times 10^{23}]$
- (A) 5 (B) 1 (C) 2 (D) 3

CSF098

Colloids and their Classifications

20. Smoke is a colloidal dispersion of :-
 (A) gas in solid (B) solid in gas (C) gas in gas (D) liquid in gas
21. Multimolecular colloids are present in :-
 (A) soap solution (B) sol of proteins (C) sol of gold (D) all of these
22. 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
 (A) $V_c = V_t = V_s$ (B) $V_s < V_c < V_t$ (C) $V_s > V_c > V_t$ (D) $V_c > V_s > V_t$
23. Which graph is correct for critical micelle concentration (CMC) ?



CSF103

24. Which of the following is an example of associated colloid ?
(A) Protein + water (B) Soap + water (C) Rubber + benzene (D) $\text{As}_2\text{S}_3 + \text{Fe}(\text{OH})_3$ CSF104
25. Milk is an example of
(A) emulsion (B) suspension (C) foam (D) sol CSF105
26. Which one of following statements is not correct in respect of lyophilic sols ?
(A) There is a considerable interaction between the dispersed phase and dispersion medium
(B) These are quite stable and are not easily coagulated
(C) They need stabilizing agent
(D) The particles are hydrated CSF106
27. An emulsion is a colloidal system of
(A) two solids (B) two liquids
(C) one gas and one solid (D) one gas and one liquid CSF107
28. At the critical micelle concentration (CMC) the surfactant molecules
(A) decompose (B) dissociate
(C) associate (D) become completely soluble CSF108
29. Point out the false statement :-
(A) Colloidal sols are homogeneous
(B) Colloids carry + ve or - ve charge
(C) Colloids show Tyndall effect
(D) The size range of colloidal particles is 1–1000 nm CSF109

Properties of Colloids

30. Point out the false statement :-
(A) Brownian movement and Tyndall effect is shown by colloidal systems
(B) Gold number is a measure of the protective power of a lyophilic colloid
(C) The colloidal mixture of a liquid in liquid is called gel
(D) Hardy-Schultz rule is related with coagulation CSF110
31. Which of the following ions will be most effective in coagulating the As_2S_3 sol :
(A) Fe^{3+} (B) Ba^{2+} (C) Cl^- (D) PO_4^{3-} CSF111
32. Select the incorrect statement :-
(A) Brownian movement depends on the size of the particles
(B) Lesser the viscosity faster in the motion
(C) Tyndall effect is not depending upon the diameter of the dispersed particles
(D) None of these CSF112

- 33.** Isoelectric point is defined as :-
 (A) The pH at which mobility of colloidal particle is zero
 (B) The pH at which mobility is maximum
 (C) The pH at which mobility is minimum
 (D) None of these
 CSF113
- 34.** Tyndall effect would be observed in a
 (A) solution (B) solvent (C) precipitate (D) colloidal sol.
 CSF114
- 35.** The ability of an ion to bring about coagulation of a given colloid depends upon
 (A) its charge
 (B) the sign of the charge alone
 (C) the magnitude of the charge
 (D) both magnitude and sign of charge
 CSF115
- 36.** An arsenious sulphide sol. carries a negative charge. The maximum precipitating power of this sol. is possessed by.
 (A) K_2SO_4 (B) $CaCl_2$ (C) Na_2PO_4 (D) $AlCl_3$
 CSF116
- 37.** The migration of colloidal particles under the influence of an electrical field is known as
 (A) electro osmosis (B) electrophoresis
 (C) electro dialysis (D) None
 CSF117
- 38.** When a lyophobic colloidal solution is observed, we can see
 (A) light scattered by colloidal particle (B) size of the colloidal particle
 (C) shape of the colloidal particle (D) relative size of the colloidal particle
 CSF118
- 39.** The arsenious sulphide sol has negative charge. The maximum coagulating power for precipitating it is of :-
 (A) 0.1 N $Zn(NO_3)_2$ (B) 0.1 N Na_3PO_4 (C) 0.1 N $ZnSO_4$ (D) 0.1 N $AlCl_3$
 CSF119

EXERCISE - S

1. In a vessel O_2 gas molecules were adsorbed on solid surface causing its partial pressure to decrease from 1 atm to 0.5 atm.

Given : $N_A = 6 \times 10^{23}$

Volume of vessel = 2.24 L

Temperature = 273 K

Total area of solid surface = 10^2 cm^2

Number of active sites per unit area = 10^{24} m^{-2}

Find number of O_2 molecules adsorbed per active site.

CSF120

2. A 0.03 M of an acid solution in benzene is dropped on water surface, the benzene evaporates and the acid forms a monomolecular film of solid type. What volume (in ml) of the above solution would be required to cover a 54000 cm^2 surface area of water with monomolecular layer of acid. Area covered by single acid molecule is 0.3 nm^2 ($N_A = 6 \times 10^{23}$)

CSF121

3. The diameter of a colloidal particle is $5000 \text{ \AA}$. If the density of substance formed, dispersed phase, is 4 gm/cc , find the value of surface area per unit mass of colloidal particle in (m^2/gm).

CSF122

4. A container contains 1 litre, 2M solution of benzene in ether. A piece of 3 kg charcoal is dipped in the solution. Molecules of benzene get adsorbed on the surface of charcoal and form monolayer. The molarity of resulting solution decreases to 1M. If surface area available for adsorption on charcoal $12\sqrt{3} \text{ cm}^2/\text{gm}$. Then find distance (in pm) between two adjacent carbon atoms in a benzene molecule.

(Assume: Shape of benzene molecule perfectly hexagonal.)

[Use: $N_A = 6 \times 10^{23}$]

CSF123

5. 112 cm^3 hydrogen gas is adsorbed uniformly at the surface of 5 gm Palladium at 273°C and 2 atm. If the effective surface area of each hydrogen molecule is 0.4 nm^2 , then the specific surface area of Palladium is :

CSF124

6. The desorption of gas molecules from the adsorbent surface obeys Arrhenius equation. The average time upto which a N_2 molecule may remain adsorbed at Pt-surface at 400K is

[Given: Pre-exponential factor, $A = 1.25 \times 10^8 \text{ s}^{-1}$;

Activation energy of desorption = 16 Kcal , $e^{20} = 5 \times 10^8$]

CSF125

7. A colloid prepared by the addition of KI to AgNO_3 solution is purified using dialysis. Find the minimum mass in grams of an electrolyte 'AB' (GMM = 60) required to completely coagulate 1ℓ of the aforementioned colloid

Given :

Active ion causing flocculation	Flocculation value(mmole/l)
A^+	50
B^-	100

CSF126

8. At 70K, the adsorption of N_2 gas at iron surface obeys Freundlich adsorption isotherm. The experimental data collected is

P(bar)	4	25	64
$\frac{x}{m}$	0.2	0.5	0.8

Where $\frac{x}{m}$ is the mass (in gm) of N_2 gas adsorbed per gm of iron at P bar pressure? The moles of N_2 gas adsorbed per gm of iron at 36 bar and 70 K, is

CSF127

9. 1.9×10^{-4} gm of the metal having density 19 gm/ml is dispersed in one litre of water to give a sol having spherical metal particles of radius 10 nm. The approximate number of metal sol particles per cm^3 of the sol is given by :

CSF128

10. If unit mass of a solid, taken as cube of volume 8 cm^3 , is powdered into identical 10^{12} cubes, then the specific surface area of the solid increased by :

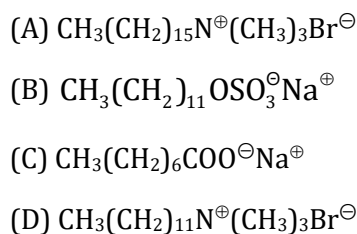
CSF129

11. If unit mass of a solid, taken as cube of volume 8 cm^3 , is powdered into identical 10^{12} cubes, the specific surface area of the solid increased by volume of 10^x . then x is :-

CSF099

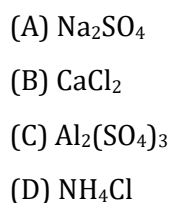
EXERCISE - JEE (Advanced) PYQ

1. Among the following, the surfactant that will form micelles in aqueous solution at the lowest molar concentration at ambient conditions is [JEE (Advanced) 2008]



CSF071

2. Among the electrolytes Na_2SO_4 , CaCl_2 , $\text{Al}_2(\text{SO}_4)_3$ and NH_4Cl , the most effective coagulation agent for Sb_2S_3 sol is [JEE (Advanced) 2009]



CSF072

3. The correct statement(s) pertaining to the adsorption of a gas on a solid surface is (are) –

[JEE (Advanced) 2011]

- (A) Adsorption is always exothermic
(B) Physisorption may transform into chemisorption at high temperature
(C) Physisorption increases with increasing temperature but chemisorption decreases with increasing temperature
(D) Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation

CSF073

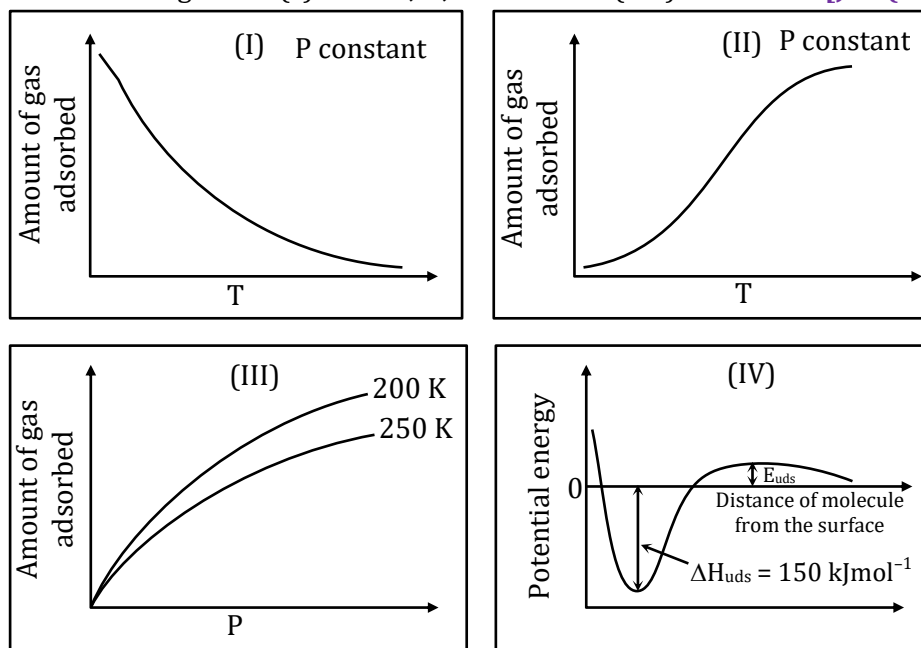
4. Choose the correct reason(s) for the stability of the **lyophobic** colloidal particle.

[JEE (Advanced) 2012]

- (A) Preferential adsorption of ions on their surface from the solution
(B) Preferential adsorption of solvent on their surface from the solution
(C) Attraction between different particles having opposite charges on their surface
(D) Potential difference between the fixed layer and the diffused layer of opposite charges around the colloidal particles

CSF074

5. The given graphs / data **I, II, III and IV** represent general trends observed for different physisorption and chemisorption processes under mild conditions of temperature and pressure. Which of the following choice(s) about **I, II, III and IV** is (are) correct? [JEE (Advanced) 2012]



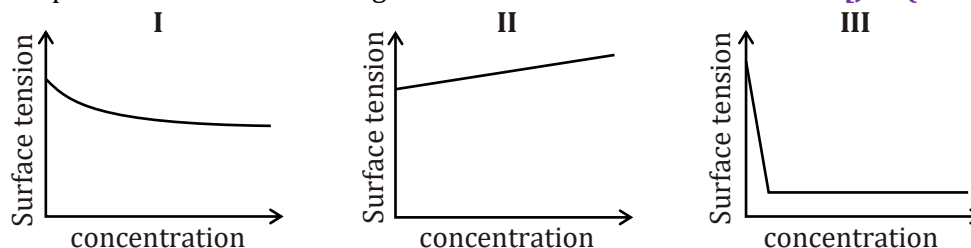
- (A) **I** is physisorption and **II** is chemisorption
 (B) **I** is physisorption and **III** is chemisorption
 (C) **IV** is chemisorption and **II** is chemisorption
 (D) **IV** is chemisorption and **III** is chemisorption

CSF075

6. Methylene blue, from its aqueous solution, is adsorbed on activated charcoal at 25°C. For this process, the correct statement is [JEE (Advanced) 2013]
 (A) The adsorption requires activation at 25°C
 (B) The adsorption is accompanied by a decrease in enthalpy
 (C) The adsorption increases with increase of temperature
 (D) The adsorption is irreversible

CSF076

7. The qualitative sketches I, II and III given below show the variation of surface tension with molar concentration of three different aqueous solutions of KCl, CH₃OH and CH₃(CH₂)₁₁OSO₃[⊖]Na[⊕] at room temperature. The correct assignment of the sketches is – [JEE (Advanced) 2016]



- | | | |
|---|--|---|
| (A) I : KCl | II : CH ₃ OH | III : CH ₃ (CH ₂) ₁₁ OSO ₃ [⊖] Na [⊕] |
| (B) I : CH ₃ (CH ₂) ₁₁ OSO ₃ [⊖] Na [⊕] | II : CH ₃ OH | III : KCl |
| (C) I : KCl | II : CH ₃ (CH ₂) ₁₁ OSO ₃ [⊖] Na [⊕] | III : CH ₃ OH |
| (D) I : CH ₃ OH | II : KCl | III : CH ₃ (CH ₂) ₁₁ OSO ₃ [⊖] Na [⊕] |

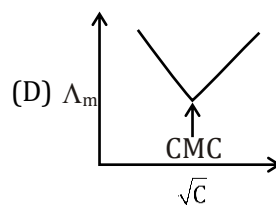
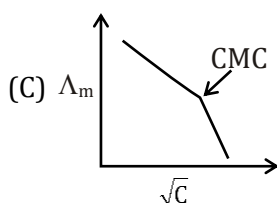
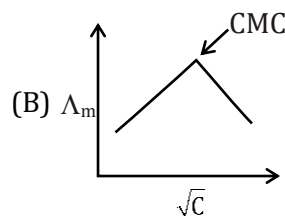
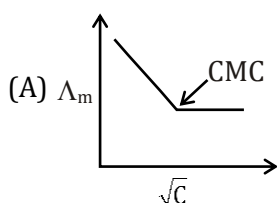
CSF077

8. The correct statement(s) about surface properties is (are) [JEE (Advanced) 2017]
- (A) Cloud is an emulsion type of colloid in which liquid is dispersed phase and gas is dispersion medium
- (B) Adsorption is accompanied by decrease in enthalpy and decrease in entropy of the system.
- (C) Brownian motion of colloidal particles does not depend on the size of the particles but depends on viscosity of the solution.
- (D) The critical temperatures of ethane and nitrogen are 563 K and 126 K, respectively. The adsorption of ethane will be more than that of nitrogen on same amount of activated charcoal at a given temperature.

CSF078

9. Molar conductivity (Λ_m) of aqueous solution of sodium stearate, which behaves as a strong electrolyte, is recorded at varying concentration (c) of sodium stearate. Which one of the following plots provides the correct representation of micelle formation in the solution ? (Critical micelle concentration (CMC) is marked with an arrow in the figures.)

[JEE (Advanced) 2019]



CSF079

JEE (Advanced) Practice Paper

This paper is for yourself practice and assessment the discussion of this paper is optional though you can see PDF solutions or video solutions or solutions in hardcopy whichever is provided.

SECTION-I

- This section contains **SIX** questions.
- Each question has FOUR options (A), (B), (C) and (D). ONLY ONE of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories:

Full Marks : +3, if only the bubble corresponding to the correct option is darkened.

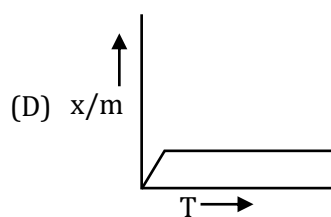
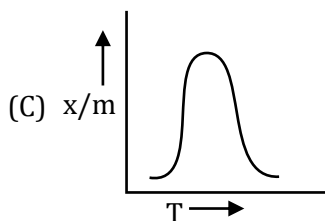
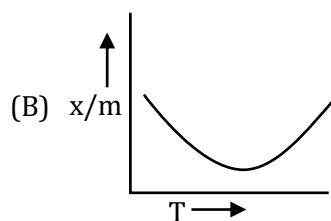
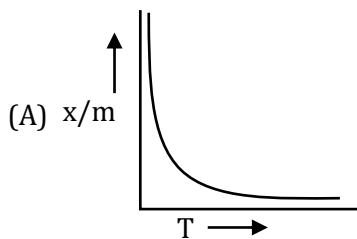
Zero Marks : 0, if none of the bubbles is darkened.

Negative Marks : -1 in all other cases

1. Arrange the following electrolytes in the increasing order of coagulation power for the coagulation of As_2S_3 sol -
- | | | | |
|---|---|---|---|
| (I) Na_3PO_4 | (II) MgCl_2 | (III) AlCl_3 | |
| (A) $\text{I} > \text{II} > \text{III}$ | (B) $\text{I} < \text{II} < \text{III}$ | (C) $\text{I} = \text{III} < \text{II}$ | (D) $\text{III} < \text{I} < \text{II}$ |

CSF051

2. Which plot is the adsorption isobar for chemisorption where x is the amount of gas adsorbed on mass m (at constant pressure) at temperature T -



CSF052

3. The coagulation value in millimoles per litre of electrolytes used for the coagulation of As_2S_3 are as below:
- I. $\text{NaCl} = 52$
 - II. $\text{KCl} = 51$
 - III. $\text{BaCl}_2 = 0.69$
 - IV. $\text{MgSO}_4 = 0.22$
- The correct order of their flocculating power is:
- | | | | |
|---|---|---|---|
| (A) $\text{I} > \text{II} > \text{III} > \text{IV}$ | (B) $\text{I} > \text{II} > \text{III} = \text{IV}$ | (C) $\text{IV} > \text{III} > \text{II} > \text{I}$ | (D) $\text{IV} = \text{III} > \text{II} > \text{I}$ |
|---|---|---|---|

CSF053

4. The potential difference between the fixed charged layer and the diffused layer having opposite charge is called:
 (A) zeta potential (B) colloidal potential
 (C) Dorn potential (D) streaming potential
 CSF054
5. Which of the following is lyophilic
 (A) Gelatine sol (B) Silver sol (C) Sulphur sol (D) As_2S_3 sol
 CSF055
6. Which of the following statements regarding sols is not correct.
 (A) Brownian movement stabilises sols.
 (B) In a reaction, catalyst may change qualitatively as well as physically.
 (C) An emulsion can be broken both by heating as well as freezing.
 (D) On prolong dialysis, colloids become stable.
 CSF056

SECTION-II

- This section contains **SIX** questions.
- Each question has **FOUR** options for correct answer(s). **ONE OR MORE THAN ONE** of these four option(s) is (are) correct option(s).
- For each question, choose the correct option(s) to answer the question.
- Answer to each question will be evaluated according to the following marking scheme:

<i>Full Marks</i>	: +4, if only (all) the correct option(s) is (are) chosen.
<i>Partial Marks</i>	: +3, if all the four options are correct but ONLY three options are chosen.
<i>Partial Marks</i>	: +2, if three or more options are correct but ONLY two options are chosen, both of which are correct options.
<i>Partial Marks</i>	: +1, if two or more options are correct but ONLY one option is chosen and it is a correct option.
<i>Zero Marks</i>	: 0, if none of the options is chosen (i.e. the question is unanswered).
<i>Negative Marks</i>	: -2 in all other cases.

7. Which statement/s is/are correct
 (A) A solution is prepared by addition of excess of AgNO_3 solution in KI solution. The charge likely to develop on colloidal particle is positive.
 (B) The effects of pressure on physical adsorption is high if temperature is low.
 (C) Gold number is the index for extent of gold plating done.
 (D) None
 CSF057
8. Which of the following is/are correct statements
 (A) Hardy Schulz rule is related to coagulation
 (B) Brownian movement and Tyndall effect are shown by colloids
 (C) When liquid is dispersed in liquid, it is called gel.
 (D) Gold number is a measure of protective power of lyophilic colloid.
 CSF058

9. Which statements is/are correct?
 (A) Physical adsorption is multilayer non-directional and non-specific
 (B) Chemical adsorption is generally monolayer and specific in nature
 (C) Physical adsorption is due to free valence of atoms
 (D) Chemical adsorption is stronger than physical adsorption
 CSF059
10. Select the Correct Statement(s) -
 (A) Lyophobic sols are irreversible sols.
 (B) Micelles formation takes place only above Kraft temperature.
 (C) PO_4^{3-} ions have more coagulation value than SO_4^{2-} ions for coagulation of positive sols.
 (D) The values of the colligative properties observed experimentally are very small for colloids compare to the true solutions
 CSF060
11. Which Of the following statements are true for hydrophilic sols?
 (A) They do not require electrolytes for stability
 (B) Their coagulation is reversible
 (C) Their viscosity is of the order of water
 (D) Their surface tension is usually lower than that of dispersion medium
 CSF061
12. Which among the following statement is true
 (A) The adsorption may be monolayered or multi-layered
 (B) Particle size of fixed amount of adsorbent will not affect the amount of adsorption
 (C) Increase of pressure increases amount of adsorption
 (D) Increase of temperature may decrease the amount of adsorption
 CSF062

SECTION-III

- This section contains a question.
- Each question has matching lists.** The codes for the lists have choices (A), (B), (C) and (D) out of which **ONLY ONE is correct**
- For each question, marks will be awarded in one of the following categories :
 Full Marks : +3, if only the bubble corresponding to the correct option is darkened.
 Zero Marks : 0, if none of the bubbles is darkened.
 Negative Marks : -1 in all other cases

13. Which of the following option show correct matches :-

Column-I		Column-II	
(a)	Precipitation of colloidal sol	(p)	Peptization
(b)	Purification of colloid	(q)	Coagulation
(c)	Gold Number	(r)	Desorption
(d)	Formation of colloidal sol	(s)	Dialysis
		(t)	Measure of protective power

- (A) a-p, b-s, c-r, d-p (B) a-s, b-q, c-p, d-r (C) a-q, b-s, c-r, d-p (D) a-q, b-s, c-t, d-p

CSF063

SECTION-IV

- This section contains a paragraph.
- Based on each paragraph, there are **TWO** questions.
- Each question has **FOUR** options (A), (B), (C) and (D) **ONLY ONE** of these four options is correct.
- For each question, darken the bubble corresponding to the correct option in the ORS.
- For each question, marks will be awarded in one of the following categories :
Full Marks : +3, if only the bubble corresponding to the correct answer is darkened.
Zero Marks : 0 in all other cases.

Paragraph for Questions (14-15)

The protective power of the lyophilic colloids is expressed in terms of gold number a term introduced by Zsigmondy. Gold number is the number of milligrams of the protective colloid which prevent the coagulation of 10 ml of red gold sol. when 1 ml of a 10 percent solution of sodium chloride is added to it. Thus, smaller the gold number of lyophilic colloids, the greater is the protective power.

14. Which of the following statement(s) is/are correct
- (A) Higher the gold number, more protective power of colloid
(B) Lower the gold number, more the protective power
(C) Higher the coagulation value, more the coagulation power
(D) Lower the coagulation value, higher the coagulation power

CSF064

15. Gold number gives an indication of
- (A) protective nature of colloids
(B) purity of gold in suspension
(C) the charge on a colloidal solution of gold
(D) g-mole of gold per litre

CSF065

SECTION-V

- This section contains **FIVE** questions.
- The answer to each question is a **NUMERICAL VALUE**.
- For each question, enter the correct numerical value (in decimal notation, truncated/rounded-off to the second decimal place; e.g. 6.25, 7.00, -0.33, -.30, 30.27, -127.30, if answer is 11.36777..... then both 11.36 and 11.37 will be correct).
- Answer to each question will be evaluated according to the following marking scheme:
Full Marks : +3, if **ONLY** the correct numerical value is entered as answer.
Zero Marks : 0 in all other cases.

16. The diameter of a colloidal particle is 5000 Å. If the density of substance formed, dispersed phase, is 4gm/cc, find the value of surface area per unit mass of colloidal particle in (m²/gm).

CSF066

17. A solution of palmitic acid (Molar mass = 256) in Benzene contain 5.12 g of acid per litre of solution. When this solution is dropped on a water surface, the Benzene evaporates and acid forms a monolayer film of solid type.

If 480 cm^2 are to be covered by a monolayer, then find X, where $X = V \times 100$, when V is volume in ml required of solution. The area covered by 1 molecule = 0.2 nm^2 ($N_A = 6 \times 10^{23}$)

CSF067

18. $1.9 \times 10^{-4} \text{ gm}$ of the metal having density 19 gm/ml is dispersed in one litre of water to give a sol having spherical metal particles of radius 10 nm . The approximate number of metal sol particles per cm^3 of the sol is 2.35×10^x then find x ?

CSF068

19. In a vessel O_2 gas molecules were adsorbed on solid surface causing its partial pressure to decreases from 1 atm to 0.5 atm .

Given : $N_A = 6 \times 10^{23}$

Volume of vessel = 2.24 L

Temperature = 273 K

Total area of solid surface = 10^2 cm^2

Number of active sites per unit area = 10^{24} m^{-2}

Find number of O_2 molecules adsorbed per active site.

CSF069

20. A colloid prepared by the addition of KI to AgNO_3 solution is purified using dialysis. Find the minimum mass in grams of an electrolyte 'AB' (GMM = 60) required to completely coagulate 1 l of the aforementioned colloid

Given :

Active ion causing flocculation	Flocculation value (mmole/l)
$\text{A}^{\oplus}$	50
$\text{B}^{\ominus}$	100

CSF070

ANSWER KEY

EXERCISE - O

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	D	A	D	B	D	B	B	B	C	C
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	B	B	A	A	A	C	B	B	B	B
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	C	C	B	B	A	C	B	C	A	C
Que.	31	32	33	34	35	36	37	38	39	
Ans.	A	C	A	D	D	D	B	A	D	

EXERCISE - S

1. (3) 2. (1) 3. (3) 4. (2)
5. ($2.4 \times 10^6 \text{ cm}^2/\text{gm}$) 6. (4 sec) 7. (6) 8. ($\frac{3}{140}$)s
9. (2.35×10^9) 10. (10^4 times) 11. (4)

EXERCISE - JEE (Advanced) PYQs

Que.	1	2	3	4	5	6	7	8	9
Ans.	A	C	ABD	AD	AC	B	D	BD	C

JEE (Advanced) Practice Paper

Section-I	Q.	1	2	3	4	5	6
	A.	B	C	C	A	A	D
Section-II	Q.	7	8	9	10	11	12
	A.	AB	ABD	ABD	ABD	ABD	ACD
Section-III	Q.	13					
	A.	D					
Section-IV	Q.	14	15				
	A.	BD	A				
Section-V	Q.	16	17	18	19	20	
	A.	3.00	2.00	9.00	3.00	6.00	

Important Notes