CHEMISTRY

BOOKS - DISHA PUBLICATION CHEMISTRY (HINGLISH)

SURFACE CHEMISTRY

Jee Main 5 Year At A Glance

1. Which one of the following is not a property of physical adsorption ?

A. Higher the pressure, more the adsorption

B. Greater the surface arca, more the adsorption

C. Lower the temperature, more the adsorption.

D. Unilayer adsorption occurs

Answer: D

2. If x gram of gas is adsobed by m gram of adsorbent at pressure P the plot of log $\frac{x}{m}$ versus log P is linear .the slope of the plot is :

(n and k are constant and n > 1)

    A. "log"k

    B. $\dfrac{n}{1}$

    C. 2k

    D. n

Answer: B

> ▶ **Watch Video Solution**

3. Among the following, correct statement is :

A. Brownian movement is more pronounced for smaller particles than for bigger-particles

B. Sols of metal sulphides are lyophilic

C. Hardy Schulze law states that bigger the size of the ions, the greater is its coagulating power

D. One would expect charcoal to adsorb chlorine more than hydrogen sulphide.

Answer: A

▶ **Watch Video Solution**

4. Adsorption of a gas on a surface follows Freundlich adsorption isotherm. Plot of $\log \dfrac{x}{m}$ versus log P gives a straight line with slope equal to 0.5, then :

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

A. Adsorption is independent of pressure

B. Adsorption is proportional to the pressure

C. Adsorption is proportional to the square root of pressure.

D. Adsorption is proportional to the square of pressure.

Answer: C

5. The Tyndall effect is observed only when following conditions are satisfied :

(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 in magnitude.

(d) The refractive indices of the dispersed phase and dispersion medium differ greatly in magnitude.

A. (i) and (iv)

B. (ii) and (iv)

C. (i) and (iii)

D. (ii) and (iii)

Answer: B

▶ Watch Video Solution

6. A particular adsorption process has the following characteristics : (i) It arises due to vander Waals forces and (ii) it is reversible. Identify the correct statement that describes the above adsorption process :

    A. Adsorption is monolayer.

    B. Adsorption increases with increase in

       temperature

    C. Enthalpy of adsorption is greater than

       $100 kJmol^{-1}$

D. Energy of activation is low

Answer: D

▶ **Watch Video Solution**

7. Egg albumin is :

A. Break an egg carefully and transfer the transparent part of the content to 100 mL of 5% w/V saline solution and stir well

B. Keep the egg in boiling water for 10 minutes. After removing the shell, transfer the yellow part of the content to 100 mL of 5% w/V saline solution and homogenize with a mechanical shaker.

C. Keep the egg in boiling water for 10 minutes. After removing the shell, transfer the white part of the content to 100 mL of 5% w/V saline solution and homogenize with a mechanical shaker

D. Break an egg carefully and transfer only

the yellow part of the content to 100 mL

of 5% w/V saline solution and stir well.

Answer: A

▶ **Watch Video Solution**

8. Gold numbers of some colloids are : Gelatin

$: 0.005 - 0.01$,Gum Arabic $:0.15 - 0.25$, Oleate

$:0.04 - 1.0$, Starch $: 15 - 25$. Which among

these is a better protective Colloid ?

A. Gelatin

B. Starch

C. Oleate

D. Gum arabic

Answer: A

▶ **Watch Video Solution**

9. For a linear plot of log (x/m) versus log p in a Freundlich adsorption isotherm, which of

the following statements is correct ? (K and n

are constants)

A. Only $1/n$ appears as the slope.

B. "log" (1/n) appears as the intercept.

C. Both k and 1/n appear in the slope term

D. 1/n appears as the intercept.

Answer: A

▶ **Watch Video Solution**

10. The following statement relate to the adsorption of gases on a solid surface. Identify the incorrect statement among them :

    A. Enthalpy of adsorption is negative

    B. Energy appears as heat

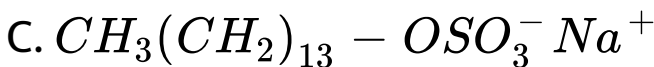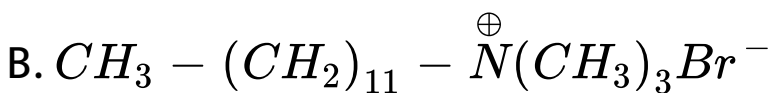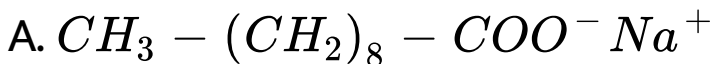   C. On adsorption, the residual forces on the surface are increased

    D. Entropy of adsorption is negative

Answer: C

11. Among the following, which surfactant will form micelles in aqueous solution at the lowest molar concentration at ambient conditions?

A. $CH_3 - (CH_2)_8 - COO^- Na^+$

B. $CH_3 - (CH_2)_{11} - \overset{\oplus}{N}(CH_3)_3 Br^-$

C. $CH_3(CH_2)_{13} - OSO_3^- Na^+$

D. $CH_3(CH_2)_{15}\overset{\oplus}{N}(CH_3)_3 Br^-$
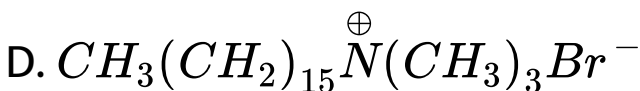
Answer: D

▶ **Watch Video Solution**

---

12. Match the catalysts to the correct processes :

Catalyst	Process
(A) $TiCl_4$	(i) Wacker process
(B) $PdCl_2$	(ii) Ziegler - Natta polymerization
(C) $CuCl_2$	(iii) Contact process
(D) V_2O_5	(iv) Deacon's process

A. A - (ii), B - (iii), C - (iv), D-(i)

B. A -(iii), B - (i), C - (ii), D - (iv)

C. A - (iii), B - (ii), C - (iv), D - (i)

D. A - (ii), B - (i), C -(iv), D - (iii)

Answer: D

▶ **View Text Solution**

Exercise 1 Concept Builder Topicewise

1. Which of the following statement is not correct

A. Physical absorption is due to van der Waals forces.

B. Physical absorption is irreversible.

C. Chemical absorption increases with increase in temperature upto certain limit than decreases

D. Enthalpy of absorption ($|\Delta H|$) for a chemical absorption is greater than that of physical absorption

Answer: B

2. The effect of pressure on adsorption is high if

a. Temperature is low

b. Temperature is high

c. Temperature is neither very low nor very high

A. temperature is low.

B. temperature is high

C. temperature is very high.

D. larger charcoal piece is taken

Answer: A

> ▶ **Watch Video Solution**

3. The heat evolved in chemisorption lies in the range (in kJ/mol) of :

A. 80 to 240

B. 20 to 40

C. 40 to 80

D. 20 to 100

Answer: A

▶ **Watch Video Solution**

4. Blue colour of the sky is due to

a. Adsorption of light by dust particles

b. Reflection of light by dust particles

c. Scattering of light by dust particles

d. Pressure of clouds which are a colloidal

dispersion of water particles in air

A. absorption of light by dust particles

B. reflection of light by dust particles

C. presence of clouds

D. Absorption may be monolayered or multilyered

Answer: C

▶ **Watch Video Solution**

5. Which among the following statements is false ?

A. Increase of pressure increases the amount of adsorption

B. Increase of temperature may decrease the amount of adsorption.

C. Absorption may be monolayered or multilyered

D. Particle size of the adsorbent will not affect the amount of absorption

Answer: D

▶ **Watch Video Solution**

6. In Langumir's model of adosrption of a gas on a solid surface :

A. the mass of gas striking a given area of surface is proportional to the pressure

of the gas.

B. the mass of gas striking a given area of

surface is independent of the pressure

of the gas

C. the rate of dissociation of adsorbed

molecules from the surface does not

depend on the surface covered

D. the adsorption at a single site on the

surface may involve multiple molecules

at the same time

Answer: A

7. How many layers are adsorbed in chemical adsorption?

A. One

B. Two

C. Many

D. Zero

Answer: A

8. Freundlich equation for adsorption of gases (in amount of Xg) on a solid (in amount od mg) at constant temperature can be expressed as

A. $\log \dfrac{X}{m} = \log P + \dfrac{1}{n}\log K$

B. $\log \dfrac{X}{m} = \log K + \dfrac{1}{n}\log P$

C. $\dfrac{X}{m} \propto P^n$

D. $\dfrac{X}{m} = \log P + \dfrac{1}{n}\log K$

Answer: B

▶ **Watch Video Solution**

9. Which of the following statements is incorret about physisorption?

A. It is reversible in nature. (b) It forms multilayer, (c) It involves high activation energy

B. It forms multilayer,

C. It involves high activation energy.

D. The extent of physisorption decreases with increase of temperature

Answer: C

10. The adsorption of gas on a solid surface varies with pressure of the gas in which of the following manner.

A. fast to slow to independent of the

pressure

B. slow to fast to independent of the

pressure

C. independent of the pressure to fast to

slow

D. independent of the pressure to slow to

fast

Answer: A

▶ Watch Video Solution

11. Adsorption is the tendency of accumulation of molecular species at the surface of solid or liquid. Depending upon the nature of bonds or forces of attraction between adsorbate and adsorbent. It is classified between physisorption and chemisorption.

Which of the following gas molecules have maximum value enthalpy of physisorption?

A. C_6H_6

B. Ne

C. H_2O

D. H_2

Answer: C

▶ **Watch Video Solution**

---

12. For adsorption of a gas on a solid, the plot of $\log (x/m)$ vs log P is linear with a slope equal to [n being a whole number]:

A. K

B. "log" K

C. n

D. $\dfrac{1}{n}$

Answer: D

13. Which is adsorbed in maximum amount by activated charcoal?

A. N_2

B. CO_2

C. CI_2

D. O_2

Answer: B

▶ **Watch Video Solution**

14. At high pressure, the entire surface gets covered by a monomolecular layer of the gas follows

A. three-halved order

B. second-order

C. first-order

D. zero-order

Answer: D

▶ **Watch Video Solution**

15. Adsorption is accompanied by :

A. decrease in enthalpy and increase in

 entropy.

B. increase in enthalpy and increase in

 entropy

C. decrease in enthalpy and decrease in

 entropy

D. increase in enthalpy and decrease in

 entropy

Answer: C

16. One gram of charcoal adsorbs 100 mL of 0.5 MCH_3COOH to form a mono-layer and thereby the molarity of acetic acid is reduced to 0.49 M. Calculate the surface area of the charcoal adsorbed by each molecule of acetic acid. Surface acid of charcoal $= 3.01 \times 10^2 m^2 / gm$

A. $0.5 \times 10^{-19} m^2$

B. $4 \times 10^{-20} m^2$

C. $0.5 \times 10^{-10} m^2$

D. $5 \times 10^{-19} m^2$

Answer: D

▶ **Watch Video Solution**

17. one gram of activated carbon has a surface are of $1000 m^2$. Considering complete coverage as well as monomolecular adsorption , how much ammonia at 1 atm and 273 K would be absorbed on the surface of $\dfrac{44}{7}$ g carbon if radius of a ammonia molecules is $10^{-8} cm$.

A. 7.46L

B. 0.33L

C. 44.8L

D. 23.5L

Answer: A

> ▶ Watch Video Solution

18. At 1 atm and 273 K the volume of nitrogen

gas required to cover a sample of silica gel,

assuming Langmuir monolayer adsorption , is

found to be $1.30cm^3 g^{-1}$ of the gel. The area occupied by a nitrogen molecule is $0.16nm^2$. Find out the no. of surface sites occupied per molecule of N_2.

A. $5.568m^2 g^{-1}$

B. $3.48m^2 g^{-1}$

C. $1.6m^2 g^{-1}$

D. None of these

Answer: A

▶ Watch Video Solution

19. A sample of 16 g charcoal was brought into contact with CH_4 gas contained in a vessel of 1 litre at $27°C$. The pressure of gas was found to fall from 760 to 608 torr. The density of chacoal sample is $1.6g/m^3$. What is the volume of the CH_4 gas adsorbed per gram of the adsorbent at 608 torr and $27°C$?

A. $125m^2g^{-1}$

B. $3.48m^2g^{-1}$

C. $16.25m^2/g^{-1}$

D. None of these

Answer: B

20. What is shape $-$ selective catalysis ?

A. enzymes

B. ziegler - Natta Catalyst

C. zeolites

D. platinum

Answer: C

21. Ziegler-Natta catalyst is:

A. $(Ph_3P)_3RhCI$

B. $K[PtCI_3C_2H_4)]$

C. $[Al_2(C_2H_5)_6] + TiCl_4$

D. $[Fe(C_2H_5)_2]$
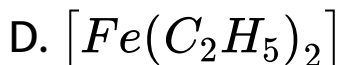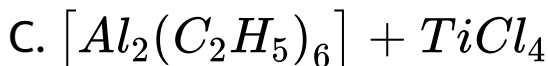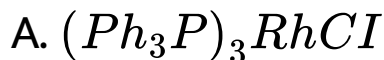
Answer: C

22. Hydrolysis of urea is an example of

A. homogenous catalysis

B. heterogenous catalysis

C. biochemical catalysis

D. zeolite catalysis

Answer: C

23. When $KClO_3$ is heated, it decomposes into KCl and O_2. If some MnO_2 is added, the reaction goes much faster because

A. MnO_2 decomposes to give O_2

B. MnO_2 provides heat by reacting.

C. better contact is provided by MnO_2

D. MnO_2 acts as a catalyst.

Answer: D

24. Which one of the following is an example of homogeneous catalysis ?

A. Haber's process of synthesis of ammonia.

B. Catalytic conversion of SO_2 to SO_3 in contact process.

C. Catalytic hydrogenation of oils.

D. Acid hydrolysis of methyl acetate.

Answer: D

25. Which of the following statement about the catalyst is/are true?

A. A catalyst accelerates the reaction by bringing down the free energy of activation.

B. A catalyst also takes part in the reaction

mechanism.

C. A catalyst makes the reaction more

feasible by making the AG' more

negative.

D. A catalyst makes the equilibrium

constant of the reaction more

favourable for the forward reaction.

Answer: A

26. Crystalloids differ from colloids mainly is respect of :

A. electrical behaviour

B. particle nature

C. particle size

D. solubility

Answer: C

▶ **Watch Video Solution**

27. Given below are a few electrolytes, indicate which one among them will bring about the coagulation of a gold sol quickest and in the least of concentration ?

A. Nacl

B. $MgSO_4$

C. $AL_2(SO_4)_3$

D. $K_4[Fe(CN)_6]$

Answer: C

▶ Watch Video Solution

28. The formation of a colloidal from suspension is

A. Peptisation

B. Condensation

C. Sedimentation

D. Fragmentation

Answer: A

▶ Watch Video Solution

29. which of the following will have the highest coagulating power for $Fe(OH)_3$ colloid ?

A. PO_4^{-3}

B. SO_4^{2-}

C. Ca^{2+}

D. Al^{3+}

Answer: A

30. 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 electrostatic repulsion between the colloidal particles

Answer: C

31. Bredigs arc method involves :

    A. dispersion of metal.

    B. condensation of metal

    C. dispersion as well as condensation.

    D. neither dispersion nor condensation

Answer: C

32. smoke precipitator work on the principal of

:

    A. centrifugation.

    B. neutralization of charge on colloids,

    C. absorption,

    D. addition of electrolytes.

Answer: B

33. According to Hardy - Schulze rule, the coagulating power of cation follows the order :

A. $Ba^{+2} > Na^+ > Ai^{+3}$

B. $Al^{+3} > Na^+ > Ba^{+2}$

C. $Al^{+3} > Ba^{+2} > Na^+$

D. $Ba^{+2} > Al^{+3} > Na^+$

Answer: C

34. Position of non-polar and polar parts in micelle is

A. Polar at outer surface and non-polar at inner surface

B. Polar at inner surface and non-polar at outer surface

C. Both polar and non-polar at inner surface

D. Distributed all over the surface.

Answer: A

▶ **Watch Video Solution**

35. which of the following forms cationic micelles above certain concentration?

A. Sodium dodecyl sulphate

B. Sodium acetate

C. Urea

D. Cetyl trimethyl aminonium bromide

Answer: D

▶ **Watch Video Solution**

36. Coagulation of Colloids

A. NaCl

B. KCl

C. $BaCl_2$

D. $AICI_3$

Answer: D

37. Which of the following is most effective in causing the coagulation of ferric hydroxide sol :-

A. KCl

B. KNO_3

C. K_2SO_4

D. $K_3[Fe(CN)_6]$

Answer: D

38. Which of the following is the best protective colloid?

A. Gelatin (Gold No. =0.005)

B. Gum arabic (Gold No.-0.15)

C. Egg albumin (Gold No. 0.08)

D. All possess same protective power

Answer: A

---

39. Example of an intrinsic colloid is

A. $As_2S_3 sol$

B. S sol

C. Egg albumin

D. $Fe_2(OH)_3 sol$

Answer: C

40. Aluminium hydroxide forms a positively charged sol.

Which of the following ionic substances should be most effective in coagulating the sol?

A. NaCl

B. $CaCl_2$

C. $Fe_2(SO_4)_3$

D. K_3PO_4
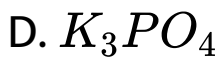
Answer: D

▶ **Watch Video Solution**

41. The process of removing dissolved impurities from a colloidal system by means of diffusion through suitable membrane under the influence of an electric field is called

A. electro-osmosis

B. electrodialysis

C. electrophoresis

D. peptization

Answer: B

▶ **Watch Video Solution**

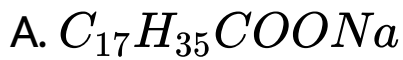**42.** A freshly formed ppt of SnO_2 is peptized by a small amount of $NaOH$. These colloidal particles may be represented as

A. $[SnO_2]SnO_3^{2-}, 2Na^+$

B. $[SnO_2]Sn^{4+}, O^{2-}$

C. $[SnO_2]Na^+, OH^-$

D. $[SnO_2]Sn^{4+}, OH^-$
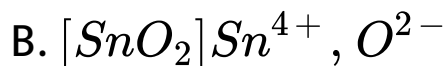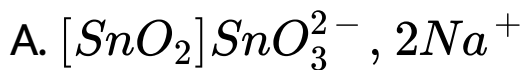
Answer: A

▶ **Watch Video Solution**

43. Hard water is not fit for washing clothes

because

A. $C_{17}H_{35}COONa$

B.
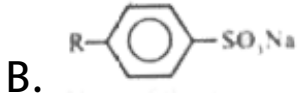
C. Both

D. None of these

Answer: B

 Watch Video Solution

44. colloidal solution of gold is prepared by :

A. different diameters of colloidal gold particles

B. variable valency of gold

C. different concentrations of gold particles

D. impurities produced by different methods

Answer: A

45. Bleeding is stopped by the application of ferric chloride. This is because

A. The blood starts flowing in opposite direction.

B. The blood reacts and forms a solid, which seals the blood vessel.

C. The blood is coagulat and thus the blood vessel is sealed

D. The ferric chloride seals the blood vessel.

Answer: C

46. Which one of the following forms micelles in aqueous solution above certain concentration?

A. Dodecyl trimethyl ammonium chloride

B. Glucose

C. Urea

D. Pyridinium chloride

Answer: A

47. the stability of lyophilic colloids is due to

A. Charge on their particles

B. Large size of their particles

C. Small size of their particles

D. A layer of dispersion medium

Answer: D

48. Which one of the following statements is not correct in respect of lyophilic sols ?

A. They are quite stable and are not easily coagulated

B. There is considerable interaction between dispersed phase and dispersion medium (water)

C. The sol particles are hydrated

D. They are very sensitive to coagulation by

a small concentration of electrolytes.

Answer: B

▶ **Watch Video Solution**

49. An emulsifier is an agenet which

A. Accelerates the dispersion

B. Homogenizes an emulsion

C. Stabilizes an emulsion

D. Aids the flocculation of an emulsion

Answer: B

 Watch Video Solution

50. Among the following, correct statement is :

A. Brownian movement is more pronounced for smaller particles than for bigger-particles

B. ols of metal sulphides are lyophilic

C. Hardy Schulze law states that bigger the size of the ons, the greater is its coagulating power.

D. One would expect charcoal to adsorb chlorine more than hydrogen sulphide

Answer: A

▶ Watch Video Solution

51. An oil-soluble dye is mixed with emulsion and the emulsion remains colourless. Then, it is

A. O-in-W

B. W-in-O

C. O-in-O

D. W-in-W

Answer: A

▶ **Watch Video Solution**

52. Arrange the following electrolytes in the increasing order of coagulating power for ferric hydroxide sol
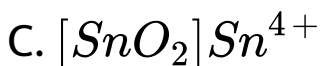
Na_3PO_4 KCl K_2SO_4 $NaCl$
   I   II   III   IV

A. I|t III|t IIII|t IV
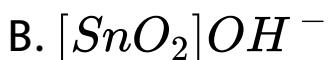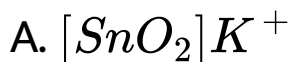
B. II = IV |tI |tI

C. II = IV |tIII|tIII
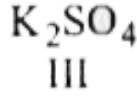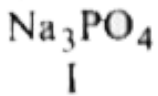
D. II = III |tIV = I

Answer: B

53. A freshly obtained of SnO_2 is peptized by little of KOH to give a sol. Particles may be represented as

A. $[SnO_2]K^+$

B. $[SnO_2]OH^-$

C. $[SnO_2]Sn^{4+}$

D. $[SnO_2]SnO_3^{2-}$
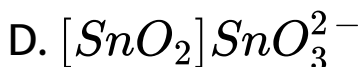
Answer: D

54. The colloidal particles are electrically charged as a indicated by their migration towards cathode or anode under the applied electric field. In a particular colloidal system, all particles carry either positive charge or negative charge.

The electric charge on colloidal particles orginate in several ways. According to preferential adsorption theory, the freshly obtained precipitate particles adsorb ions

from the dispersion medium, which are common to their lattice and acquire the charge of adsorbed ions. For example, For example, freshly obtained $Fe(OH)_3$ precipitated is dispersed, by a little $FeCl_3$, into colloidal solution owing to the adsorption of Fe^{3+} ions in preference. Thus sol particles will be positively charged.
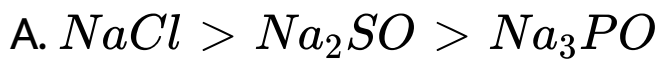
In some cases the colloidal particles are aggregates of cations or anions having ampiphilic character. When the ions posses hydrophobic part (hydrocarbon end) as well as hydrophilic part (polar end group), they

undergo association in aqueous solution to form particles having colloidal size. The formation of such particles, called micelles plays a very important role in the solubilization of water insoluble substances, (hydrocarbon, oils, fats, grease etc.). In micelles, the polar end groups are directed towards water and the hydrocarbon ends into the centre. The charge on sol particles of proteins depends on the pH. At low pH, the basic group of protein molecule is ionized (protonated) and at higher pH (alkaline medium), the acidic group is ionized. At

isoelectric pH, characteristic to the protein, both basix and acidic groups are equally ionized. The stability of colloidal solution is attributed largely to the electric charge of the dispersed particles. This charge causes them to be coagulated or precipitated. On addition of small amount of electrolytes, the ions carrying oppiste charge are adsorbed by sol particles resulting in the neutralization of their charge. When the sol particles either with no charge or reduced charge, come closer due to Brownian movement, they coalesce to form bigger particles resulting in their

separation from the dispersion medium. This is what is called coagulating or precipitation of the colloidal solution. The coagulating power of the effective ion, which depend on its charge, is expressed in terms of its coagulating value, defined as its minimum concentration (m mol/L) needed to precipitate a given sol.

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, Na_2SO_4 and Na_3PO_4 solutions. Their coagulating values will be in the order :
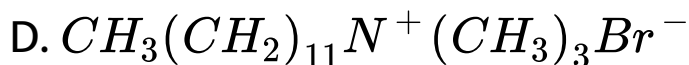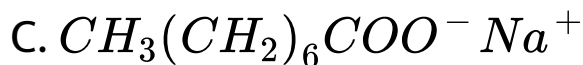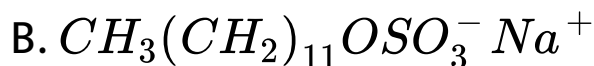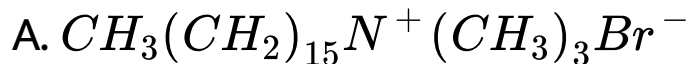
A. $NaCl > Na_2SO > Na_3PO$

B. $Na_3SO_4 > Na_3PO_4 > NaCI$

C. $Na_3PO_4 > Na_2SO_4 > NaCl$

D. $Na_2SO_4 > NaCl > Na_3PO_4$

Answer: A

▶ **Watch Video Solution**

55. Among the following, which surfactant will

form micelles in aqueous solution at the

lowest molar concentration at ambient conditions?

A. $CH_3(CH_2)_{15}N^+(CH_3)_3Br^-$

B. $CH_3(CH_2)_{11}OSO_3^-Na^+$

C. $CH_3(CH_2)_6COO^-Na^+$

D. $CH_3(CH_2)_{11}N^+(CH_3)_3Br^-$

Answer: B

56. Which of the following has minimum flocculation value for positively charged sol?

A. Dialysis

B. Addition of electrolytes

C. Diffusion through animal membrane

D. Condensation

Answer: B

▶ Watch Video Solution

57. A detergent $(C_{12}H_{25}SO_4{}^{-}(-)Na^{+})$ solution becomes colloidal sol at a concentration of $10^{-3}M$. On an average 10^{13} colloidal partcles are present in $1mm^3$. What is the average number of ions which are contained by one colloidal particle (micelle)?

A. 6×10^7

B. 10

C. 60

D. None of these

Answer: C

58. The volume of a colloidal particle V_C as compared to the volume of a solute particle in a true solution V_S could be

A. $\dfrac{V_c}{V_s} = 10^3$

B. $\dfrac{V_c}{V_s} = 10^{-3}$
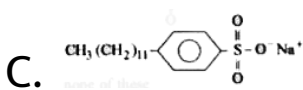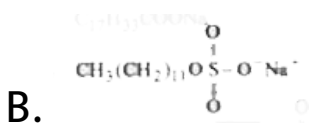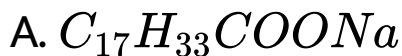
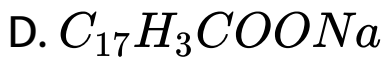C. $\dfrac{V_c}{V_s} = 10^{23}$

D. $\dfrac{V_c}{V_s} = 1$

Answer: A

59. A lot of scum formation was observed during washing with hard water. The washing powder could be

A. $C_{17}H_{33}COONa$

B.

$CH_3(CH_2)_{11}OS-O^-Na^+$ (with O double bonds on S)

C.

$CH_3(CH_2)_{11}$—⟨O⟩—$S-O^-Na^+$ (with O double bonds on S)

D. $C_{17}H_3COONa$

Answer: A

▶ **View Text Solution**

---

60. In an experiment, addition of $4.0mL$ of $0.005MBaCl_2$ to $16.0mL$ of arsenious sulphide sol just cause the complete coagulation in $2h$. The flocculating value of the effective ion is:

A. $CI^- 1.0$

B. CI^-, 2.0

C. Ba^{2+} 1.0

D. Ba^{2+}, 0.5

Answer: C

▶ **Watch Video Solution**

Exercise 2 Concept Applicator

1. which gas will be adsorbed on a solid to greater extent ?

A. Having non-polar molecule.

B. Having highest critical temperature.

C. Having lowest critical temperature

D. aving lowest critical pressure.

Answer: B
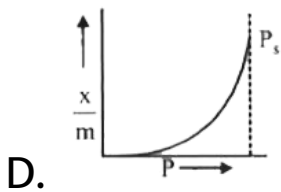
▶ **Watch Video Solution**
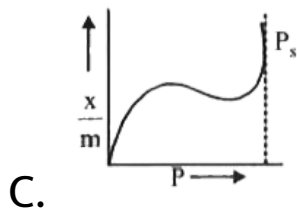
2. Which of the following adsorption isotherms represents the adsorption of a gas

by a soild involving multilayers of formation ?

(p_s = saturation pressure)

A.

B.

C.

D.
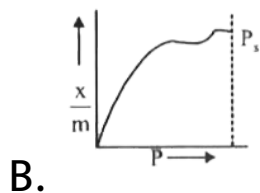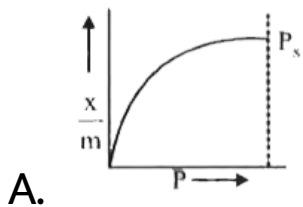
Answer: A

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

   A. in the process of absorption, the activation energy of the molecules becomes large

B. absorption produces heat which

increases the speed of the reaction.

C. absorption lowers the activation energy

of the reaction

D. absorption increases the activation

energy of the reaction

Answer: C

▶ **Watch Video Solution**

4. Which of the following is true in respect of chemical 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. $\Delta H > 0, \Delta S < 0, \Delta G > 0$

Answer: B

▶ Watch Video Solution

5. For the graph below, select correct order of temperature?

Pressure (P)
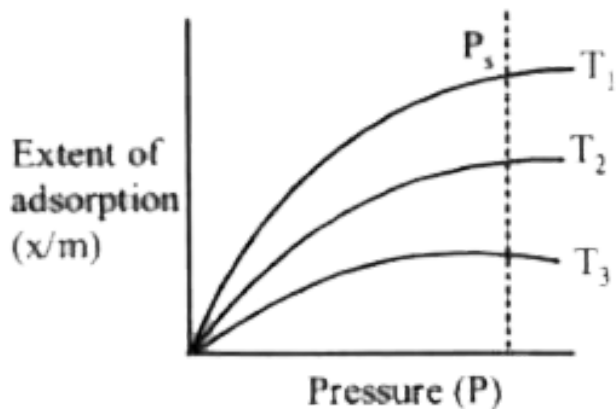
A. $T_1 > T_2 > T_3$

B. $T_2 > T_3 > T_1$

C. $T_3 > T_2 > T_1$

D. $T_1 = T_2 = T_3$

Answer: A

6. Although, nitrogen does not adsorb on a surface at room temperature, it adsorbs on the surface at 83 K. Which one of the following statements is correct?

   A. At 83 K, there is formation of monolayer.

   B. At 83 K, nitrogen is adsorbed as atoms

C. At 83 K, nitrogen molecules are held by chemical bonds.

D. At 83 K, there is formation of multimolecular layers.

Answer: D

7. Methylene blue, from its aqueous solution is adsorbed on activated charcoal at $25°C$. For this process, the correct statement is

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.

Answer: B

▶ Watch Video Solution

8. In freundlich adsorption isotherm, the value of 1/n is :

A. between 0 and 1 in all cases

B. between 2 and 4 in all cases.

C. l in case of physical adsorption.

D. 1 in case of chemisorption.

Answer: A

▶ Watch Video Solution

9. Which one of the following is not applicable to the phenomenon of adsorption?

A. When acetic acid solution is shaken with charcoal the concentration of the acid decreases.

B. The white precipitate of $Mg(OH)_2$ attains blue colour when precipitated in the presence of magneson reagent.

C. The air becomes dry in the presence of silica gel.

D. An aqueous solution of NaOH attains pink colour with a drop of phenolphthalein.

Answer: D

▶ **Watch Video Solution**

10. Which of the following statements is incorrect regarding physisorption?

A. More easily liquefiable gases are adsorbed readily

B. Under high pressure it results into multi molecular layer on adsorbent surface.

C. Enthalpy of adsorption (A dmin) is low and positive

D. It occurs because of van der Waal's forces.

Answer: C

▶ **Watch Video Solution**

11. In the titration of Cl^- ions in solution with $AgNO_3$ sodium salt of fluorescein is used as an indicator. The equivalence point is marked with the appearance of reddish pink colour. This is due to

    A. adsorption of Cl^- ions by AgCl precipitate particles

    B. adsorption of NO^{3-} ions by AgCl precipitate particles

C. adsorption of Ag^+ ions by AgCl particles followed by adsorption of fluorescein anion.

D. reaction of fluorescein anion with Ag^+ ions in the solution

Answer: C

▶ View Text Solution

12. In an experiment, $200mL$ of $0.5M$ oxalic acid is shaken with $10g$ of activated charcoal and filtered. The concentration of the filtrate is reduced to $0.4M$. The amount of adsorption (x/m) is

(a) 0.9 b. 1.8 c. 0.18 d. 0.09

A. 0.9

B. 1.8

C. 0.18

D. 0.09

Answer: C

13. The oxidation of oxalic acid by acidified $KMnO_4$ becomes fast as the reaction progresses due to :

    A. promoter

    B. catalytic poison

    C. autocatalysis

    D. inhibitor

Answer: C

14. A chemical reaction has catalyst X. Hence X

A. reduces enthalpy of the reaction.

B. decreases rate constant of the reaction

C. increases activation energy of the

reaction.

D. does not affect equilibrium constant of

the reaction

Answer: D

▶ **Watch Video Solution**

15. On adding $AgNO_3$ solution into KI

solution, a negatively charged coll oidal sol is

obtained when they are in :

A. 50 mL of $0.1 M AgNO_3 + 50$mL of 0.1

MKI

B. 50 mL of $0.1 M AgNO_3 + 50$ mL of 0.2

MKI

C. 50 mL of $0.2 M AgNO_3 + 50$ mL of 0.1

MKI

D. none of these

Answer: B

▶ Watch Video Solution

16. A sol is prepared by addition of excess of $AgNO_3$ solution in KI solution . The charge likely to develop on colloidal particles is :

A. Positive

B. Negative

C. No change

D. Both charges

Answer: A

17. The gold numbers of protective colloids A,B,C and D are 0.04, 0.004, 10 and 40 respectively . The protective powers of A,B,C and D are in the orders .

    A. AgtBgtCgtD

    B. BgtAgtCgtD

    C. DgtCgtAgtB

    D. DgtCgtBgtA

Answer: B

18. which of the following statement is not true about the oil - in - water type emulsion ?

A. Addition of small amount of water, no separate layer of water is formed.

B. Addition of a small amount of oil soluble dye renders the entire emulsion coloured

C. Addition of oil results in the formation of two layers.

D. Addition of a small amount of an electrolyte increases the conductivity of the emulsion.

Answer: B

▶ **Watch Video Solution**

19. Select incorrect statement

A. Gold sol is multimolecular colloid

B. Large number of particles of a substance aggregate together and formed multimolecular colloids

C. Metal sulphides are lyophobic colloids.

D. Sulphur sol is multimolecular colloid and hydrophilic in nature.

Answer: D

▶ **Watch Video Solution**

20. for the coagulation of 50 mL of ferric hydroxide sol 10 mL of 0.5 M KCl is required. What is the coagulation value of KCl ?

A. 5

B. 10

C. 100

D. None of these

Answer: C

> ▶ **Watch Video Solution**

21. If the dispersed phase is a liquid and the dispersion medium is a solid , the collide is known as a/an

A. a sol

B. a gel

C. an emulsion

D. a foam

Answer: B

 Watch Video Solution

22. Coagulation value of the electrolytes $AlCl_3$ and NaCl for As_2S_3 sol are 0.093 and 52 respectively. How many times $AlCl_3$ has greater coagulating power than NaCl?

   A. 930

   B. 520

   C. 560

   D. None of these

Answer: C

23. The density of gold is $19g/cm^2$.Find the volume of 95 g of gold.

    A. 1.9×10^{12}

    B. 6.3×10^{14}

    C. 6.3×10^{10}

    D. 2.4×10^{6}

Answer: D

▶ **Watch Video Solution**

24. The charge on the colloidal particle is due to preferential adsorption of inos.

    A. presence of electrolyte.

    B. very small size of particles.

    C. adsorption of ions from the solution,

    D. none of these.

Answer: C

▶ **Watch Video Solution**

25. which of the following does not contain a hydrophobic structures.

    A. Linseed oil

    B. Lanolin

    C. Glycogen

    D. Rubber

Answer: D

▶ **Watch Video Solution**

26. A thixotropic gel is characterised by

A. reversible transformation of gel into sol on heating.

B. irreversible transformation of gel into sol by stirring

C. reversible transformation of gel into sol by stirring.

D. swelling on placing in the dispersion medium

Answer: C

27. which property of colloidal solution is independent of charge on the colloidal particles ?

A. Electrophoresis

B. Electro-osmosis

C. Tyndall effect

D. Coagulation

Answer: C

---

28. Which one of the following characteristics is associated with adsorption ?

A. ΔG is negative but ΔH and ΔS are positive.

B. ΔG, ΔH and ΔS all are negative.

C. ΔG and ΔH are negative but ΔS is positive.

D. ΔG and ΔS are negative but ΔH is positive.

Answer: B

 Watch Video Solution

---

29. Fog is a colloidal solution of

A. Liquid in gas

B. Gas in liquid

C. Solid in gas

D. Gas in gas

Answer: A

30. Which one of the following statements is

not correct?

A. The value of equilibrium constant is changed in the presence of a catalyst in the reaction at equilibrium.

B. Enzymes catalyse mainly bio-chemical reactions.

C. Coenzymes increase the catalytic activity of enzyme.

D. Catalyst does not initiate any reaction.

Answer: A