



## CHEMISTRY

**BOOKS - UNIVERSAL BOOK DEPOT 1960**

**CHEMISTRY (HINGLISH)**

**SURFACE CHEMISTRY**

### Adsorption And Adsorption And Isotherm

1. The Langmuir adsorption isotherm is deduced using the assumption.

A. The adsorption takes place in multilayers

- B. the adsorption sites are equivalent in their ability to adsorb the particle
- C. The heat of adsorption varies with coverage
- D. The adsorbed molecules interact with each other

**Answer: B**



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2. If  $x$  is the amount of adsorbate and  $m$  is the amount of adsorbent, which of the following relation is not related to adsorption process ?

A.  $\frac{x}{m} = p \times T$

B.  $\frac{x}{m} = f(p)$  at constant  $T$

C.  $\frac{x}{m} = f(T)$  at constant P

D.  $p = f(T)$  at constant  $\left(\frac{x}{m}\right)$

**Answer: A**

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3. 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. 1 in case of physical adsorption
- D. 1 in case of chemisorption

**Answer: A**



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4. The physical adsorption of gases on the solid surface is due to :

- A. chemical forces
- B. Electrostatic forces
- C. Gravitational forces
- D. Vander Waal's forces

**Answer: D**



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5. At high pressure ,Langmuir adsorption isotherm takes the form :

A.  $\frac{x}{m} = \frac{ap}{1 + bp}$

B.  $\frac{x}{m} = \frac{a}{b}$

C.  $\frac{x}{m} = ap$

D.  $\frac{m}{x} = \frac{b}{a} + \frac{1}{ap}$

**Answer: B**



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6. which one of the following is not applicable to chemisorption ?

A. it is slow

B. it is irreversible

C. it is highly specific

D. it is independent of temperature

**Answer: D**



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

A. Fast  $\rightarrow$  slow  $\rightarrow$  independent of the pressure

B. Slow  $\rightarrow$  fast  $\rightarrow$  independent of the pressure

C. Independent of the pressure  $\rightarrow$  fast  $\rightarrow$  slow

D. Independent of the pressure  $\rightarrow$  slow  $\rightarrow$  fast

**Answer: A**

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**8.** Bone charcoal is used to decolourise sugar. In temperature on physical adsorption?

A. adsorbs coloured material

B. Absorbs decolourised material

C. Reduced coloured material

D. None of these

**Answer: A**



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9. When the temperature is raise, the viscosity of liquid decreases, this is because,

A. Decreased volume of the solution

B. Increase in temperature increases the average kinetic energy of molecules, which overcome the attractive force between them

C. decreased covalent and hydrogen bond forces

D. Increased attraction between molecules



**Answer: B**

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**10.** The viscosity of a liquid molecule depends on :

- A. Isothermic nature
- B. Solute-solute interaction
- C. Solute-solvent interaction
- D. Density of the liquid

**Answer: D**

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11. Plot of  $\log$  against  $\log P$  is a straight line inclined at an angle of  $45^\circ$ . When the pressure is 0.5 atm and Freundlich parameter,  $K$  is 10, the amount of solute adsorbed per gram of adsorbent will be : ( $\log 5=0.6990$ )

A. 1 g

B. 2 g

C. 3 g

D. 5g

**Answer: D**



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12. Choose the incorrect statement in respect of physisorption

A. it is not specific in nature

B. It arises because of vander Waal's forces

C. it is reversible in nature

D. Enthalpy of adsorption is in the range 80-240 kJ

$mol^{-1}$

**Answer: D**



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13. In the adsorption of a gas on solid, Freundlich isotherm is obeyed. The slope of the plot is zero. Thus, the extent of adsorption is

- A. Directly proportional to the pressure of the gas
- B. Inversely proportional to the pressure of the gas
- C. Directly proportional to the square root of the pressure of the gas
- D. Independent of the pressure of the gas

**Answer: D**



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14. Which of the following statements about physical adsorption is correct ?

A. High temperature and high pressure favour adsorption

B. High temperature and low pressure favour adsorption

C. Low temperature and high pressure favour adsorption

D. Temperature and pressure have no effect on adsorption

**Answer: C**



15. Adsorption is always exothermic in nature , Do you agree ?

- A. Endothermic
- B. Exothermic
- C. Either (a) or (b)
- D. None of these

**Answer: B**



16. 0.2g of fine animal charcoal is mixed with half litre of acetic acid solution and shaken for 30 minutes

- A. Concentration remains same
- B. concentration increases
- C. Concentration of the solution decrease
- D. None of these

**Answer: C**



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17. Which one of the following is used for reviving the exhausted permutit ?

A. HCl solution

B. 10%  $CaCl_2$  solution

C. 10%  $MgCl_2$  solution

D. 10% NaCl solution

**Answer: D**



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**18.** In neutralisation of KI by  $AgNO_3$  positive charge is due to adsorption of

A.  $Ag^+$  ions

B. Ag



C. I ions

D. Both (b) and (c)

**Answer: A**



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**19.** Which characteristic is not associated with chemical adsorption?

A. Is irreversible

B. Forms monolayer

C. Not very specific

D. Heat of adsorption  $\text{gt } 50 \text{ kJ mol}^{-1}$

**Answer: C**

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20. Which of the following gases is adsorbed most by activated charcoal?

A.  $N_2$

B.  $H_2$

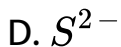
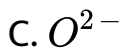
C.  $CO_2$

D.  $CH_4$

**Answer: C**

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21. The charge on  $As_2S_3$  sol is due to the adsorbed :



**Answer: D**



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22. According to Langmuir adsorption isotherm, the amount of gas adsorbed at very high pressure

A. Reaches a constant limiting value

B. Goes on increasing with pressure

C. Goes on decreasing with pressure

D. Increases first and decreases later with pressure

**Answer: A**



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**23.** How does chemical adsorption of a gas on the surface of a solid vary with temperature ?

A. One

B. Two

C. Multi

D. Zero

**Answer: A**



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**24.** When the temperature is lowered and pressure is raised, the adsorption of a gas on a solid

A. Decreases

B. Increases

C. Remains unaffected

D. Decreases first then increases

**Answer: B**



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25. Which of the following kinds of catalysis can be explained by the adsorption theory?

- A. Homogenous catalysis
- B. Acid base catalysis
- C. Heterogenous catalysis
- D. Enzyme catalysis

**Answer: C**



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26. Adsorbed acetic acid on activated carbon is :

- A. Adsorber
- B. Absorber
- C. Adsorbent
- D. Adsorbate

**Answer: D**



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27. Which of the following statement is not correct ?

- A. Physical adsorption is due to Vander Waal's forces

B. Chemical adsorption decreases at high temperature and low pressure

C. Physical adsorption is reversible

D. Adsorption energy for a chemical adsorption is generally greater than that of physical adsorption

**Answer: B**

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**28.** 50ml of 1M oxalic acid is shaken with 0.5g of wood charcoal. The final concentration of the solution after adsorption is 0.5M. Amount of oxalic acid absorbed per gm of charcoal is



A. 3.45 gm

B. 3.15 gm

C. 6.30 gm

D. None

**Answer: C**



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**29.** The equation for Freundlich adsorption isotherm is

A.  $\frac{x}{m} = kp^{1/n}$

B.  $x = mkp^{1/n}$

C.  $x/m = kp^{-n}$

D. All of these

**Answer: D**

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**30.** Which of the following characteristics is not correct for physical adsorption ?

- A. Monomolecular layer forms on the adsorbent
- B. Adsorption increases with increase in temperature
- C. Adsorption is spontaneous
- D. Both enthalpy and entropy of adsorption are negative

**Answer: A::B**

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**31.** In Langumir's model of adsorption of a gas on a solid surface :

- A. The rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered
- B. The adsorption at a single site on the surface may involve multiple molecules at the same time.
- C. The mass of gas striking a given area of surface is proportional to the pressure of the gas

D. The mass of gas striking a given area of surface is independent of the pressure of the gas

**Answer: C**

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**32.** Which of the following statements is incorrect regarding physisorption?

- A. It occurs because of vander Waal's forces
- B. More easily liquefiable gases are adsorbed readily
- C. Under high pressure it results into multi molecular layer on adsorbent surface

D. Enthalpy of adsorption ( $\Delta H_{\text{adsorption}}$ ) is low and positive.

**Answer: D**

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**33.** Animal charcoal is used in decolourising colour of liquids because it is a good

- A. Adsorbate
- B. Adsorbent
- C. Oxidising agent
- D. Reducing agent

**Answer: B**

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34. Which of the following is not a characteristic of chemisorption?

- A.  $\Delta H$  is of the order of 400 kJ
- B. Adsorption is irreversible
- C. Adsorption may be multimolecular layer
- D. Adsorption is specific

**Answer: C**

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**35.** Chromatography analysis is done based on the property of:

- A. Diffusion
- B. Absortion
- C. Adsorption
- D. Condensation

**Answer: C**

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**36.** Noble gases are adsorbed by

- A. Anhydrous calcium chloride

B. ferric hydroxide

C. Conc.  $H_2SO_4$

D. Activated coconut charcol

**Answer: D**



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**37.** Adsorption due to strong chemical force is called

A. Chemisorption

B. Physisorption

C. Reversible adsorption

D. Both (b) and (c)



**Answer: A**

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**38.** Which among the following statement is false?

- A. The adsorption may be monolayered or multilayered
- B. particle size 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

**Answer: B**

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**39.** Activated charcoal is used to remove colouring matter from pure substance, it works by

- A. Oxidation
- B. Reduction
- C. Bleaching
- D. Adsorption

**Answer: D**

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40. The extent of adsorption of a gas on a solid depends on :

- A. Nature of the gas
- B. Pressure of the gas
- C. Temperature of the gas
- D. All are correct

**Answer: D**



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41. Which adsorption takes place at low temperature?

- A.  $\Delta H > 0$  and  $\Delta S < 0$

B.  $\Delta H < 0$  and  $\Delta S < 0$

C.  $\Delta H > 0$  and  $\Delta S > 0$

D.  $\Delta H < 0$  and  $\Delta S > 0$

**Answer: B**



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**42.** A solid acts as an adsorbent because it has

A. A definite shape

B. Small pores in it

C. Unsaturated valencies

D. A high lattice energy

**Answer: C**

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**43.** Which of the following statement is not correct:-

- A. The extent of adsorption depends on the nature of the adsorbent and adsorbate
- B. The extent of adsorption depends on the pressure of the gas
- C. The extent of adsorption depends on the temperature
- D. The extent of adsorption has no upper limit

**Answer: D**



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**44.** In the adsorption of oxalic acid on activated charcoal, the activated charcoal is called

- A. Adsorbent
- B. Adsorbate
- C. Adsorber
- D. Absorber

**Answer: A**



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45. The colloidal system consisting of a liquid adsorbate in a solid adsorbent is termed as:

- A. Aerosol
- B. Sol
- C. Foam
- D. Gel

**Answer: B**



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46. Assertion:  $NH_3$  adsorbs more readily over activated charcoal than  $CO_2$

Reason:  $NH_3$  is non-polar.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. if both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: C**



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**47.** Assertion: Physical absorption of molecular takes place on surface only.



Reason: In this process, the bonds of the absorbed molecules are not broken.

A. if both assertion and reason are true and the reason is the correct explanation of the assertion.

B. if both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

**Answer: D**



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**48.** Assertion: Viscosity of a liquid decreases on increasing the temperature.

Reason: Evaporation of liquid increases with rise in temperature.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. if both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: B**



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**49.** Assertion :- An increase in surface area increases the rate of evaporation.

Reason :- Stronger the inter-molecular attractive forces, fast is the rate of evaporation at a given temperature.

A. if both assertion and reason are true and the reason is the correct explanation of the assertion.

B. if both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

**Answer: C**



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50. Assertion: According to Freundlich:  $\frac{x}{m} = k \cdot P^{1/n}$

Reason: The isotherm shows variation of the amount of gas adsorbed with temperature.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. if both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: C**



**51. Assertion:** When a finely divided active carbon or clay is stirred into a dilute solution of a dye, the intensity of colour in the solution is decreased.

**Reason:** the dye is adsorbed on the solid surface.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. if both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: A**

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## Catalyst And Catalysis

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

A. Adsorption lowers the activation energy of the reaction

B. The concentration of reactant molecules at the active centres of the catalyst becomes high due to adsorption

C. In the process of adsorption, the activation energy of the molecules becomes large

D. Adsorption produces heat which increases the speed of the reaction.

**Answer: A**



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2. The addition of a catalytic during a chemical reaction alters which of the following quantities ?

A. Entropy

B. Internal energy

C. Enthalpy

D. Activation energy

**Answer: D**



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**3. Which of the following statements about catalysts is /are true ?**

A. It lowers the energy of activation

B. The catalyst altered during the reaction is regenerated

C. It does not alter the equilibrium

D. All of these



**Answer: D**

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4. Which of the following processes does not involve a catalyst ?

- A. Haber's process
- B. Termite process
- C. Ostwald process
- D. Contact process

**Answer: B**

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5. Catalyst used in the oxidation of  $SO_2 \rightarrow SO_3$

A. Nickel

B.  $ZnO$ .  $Cr_2O_3$

C.  $V_2O_5$

D. Iron

**Answer: C**



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6. the process which is catalyzed by one of the product is called

A. Acid-base catalysis

B. Autocatalysis

C. Negative catalysis

D. None of these

**Answer: B**



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7. Enzymes with two sites are called

A. Apoenzyme

B. Holoenzyme

C. Allosteric enzyme

D. Conjugate enzyme

**Answer: C**

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8. Given below, catalyst and corresponding process/reaction are matched. The mismatch is

A.  $[RhCl(PPh_3)_2]$ : Hydrogenation

B.  $TiCl_4 + Al(C_2H_5)$ : polymerisation

C.  $V_2O_5$ : Haber-Bosch process

D. Nickel: Hydrogenation

**Answer: C**

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9. Enzymes are

A. Substances made chemists to activate washing powder

B. Very active vegetable catalysts

C. Catalysts found in organism

D. Synthetic catalysts

**Answer: C**



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10. Catalyst used in hydrogenation of oils is

A. Pt

B. Mo

C. Fe

D. Ni

**Answer: D**



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**11.** The effect of a catalyst in a chemical reaction is to change the :

A. Does not initiate a reaction

B. Increases the activation energy of the reaction

C. Changes the equilibrium constant of a reaction

D. Does not change the rate of the reaction

**Answer: A**

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**12.** Reaction of zeolite catalyst depend upon :

A. Pores

B. Apertures

C. Size of cavities

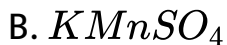
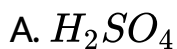
D. All of these

**Answer: D**

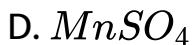


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13. Write the balanced reaction of titration of  $KMnO_4$  Vs oxalic acid in presence of  $H_2SO_4$ .



C. Oxalic acid



**Answer: D**



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14. Platinised asbestos is used as a catalyst in the manufacture of  $H_2SO_4$ . It is an example of :

- A. Heterogenous catalyst
- B. Autocatalyst
- C. Homogenous catalyst
- D. Induced catalyst

**Answer: A**

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15. Which is the catalyst used in the manufacture of sulphuric acid by lead chamber process ?

A. Platinum

B. Oxide of nitrogen

C. Nickel

D. Vanadium compounds

**Answer: B**



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**16.** Which of the following statement regarding catalyst is not true?

A. A catalyst remains unchanged in composition and quantity at the end of the reaction

B. A catalyst can initiate a reaction

C. A catalyst does not alter the equilibrium in a reversible reaction

D. Catalyst are sometimes very specific in respect of reaction

**Answer: B**



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**17. Which of the following statements is incorrect:-**

A. Enzymes are in colloidal state

B. Enzymes are catalyst

C. Enzymes can catalyse and reaction

D. Urease is an enzyme

**Answer: C**

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**18.** Which of the following is used as a catalyst in the manufacture of toluene from benzene with  $CH_3Cl$ ?

A. Ni

B. Anhydrous  $AlCl_3$

C. Pd

D. Pt

**Answer: B**

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**19.** A catalyst is used to

- A. Only for increasing the velocity of the reaction
- B. For altering the velocity of the reaction
- C. Only for decreasing the velocity of the reaction
- D. All a,b and c are correct

**Answer: D**

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20. In Haber's process for the manufacture of ammonia, the catalyst used is finely divided \_\_\_\_\_.

- A. Finely divided iron is used as catalyst
- B. Finely divided molybdenum is used as catalyst
- C. Finely divided nickel is used as catalyst
- D. No catalyst is necessary

**Answer: A**

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21. Which one of the following statements is incorrect in the case of Heterogenous catalysis

- A. The catalyst lowers the energy of activation
- B. The catalyst actually forms a intermediate compound with the reactant
- C. The surface of the catalyst plays a very important role
- D. There is no change in the energy of activation

**Answer: D**



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**22.** 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**



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**23.** A catalyst is a substance which

- A. Alters the equilibrium in a reaction
- B. Is always in the same phase as the reactants



C. Participates in the reaction and provides easier pathway for the same

D. Does not participate in the reaction but speeds it up.

**Answer: D**



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**24.** The ability of a catalyst to accelerate the chemical reaction is known as

A. Selectivity

B. activity

C. Negative catalyst

D. None of these

**Answer: B**



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**25.** A catalyst can affect reversible reaction by:-

A. Changing equilibrium

B. Slowing forward reaction

C. Attaining equilibrium in both direction

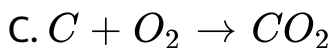
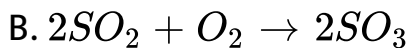
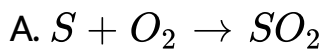
D. None of these

**Answer: C**



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26. Which requires catalyst ?



D. All

**Answer: B**



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27. Organic catalysts differ from inorganic catalysts

- A. By acting at very high temperature
- B. By acting at low temperature
- C. Being used up
- D. Being proteinous in nature

**Answer: D**

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28. Which of the statement is wrong among the following:-

- A. Haber's process of  $NH_3$  requires iron as catalyst
- B. Friedel-craft's reaction uses anhydrous  $AlCl_3$

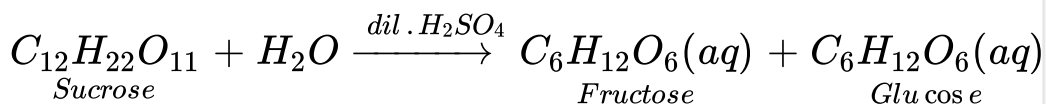
C. Hydrogenation of oils uses iron as catalysts

D. oxidation of  $SO_2$  to  $SO_3$  requires  $V_2O_5$ .

**Answer: C**

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**29.**



In this reaction, dilute  $H_2SO_4$  is called

A. Homogenous catalysis

B. Homogenous catalyst

C. Heterogenous catalysis

D. Heterogenous catalyst

**Answer: B**

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30. which of the following is true about catalyst?

- A. It initiates reaction
- B. It changes equilibrium point
- C. It increase average kinetic energy
- D. It accelerates the rate of reaction.

**Answer: D**

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**31.** Adam's catalyst is

A. Platinum

B. Iron

C. Molybdenum

D. Nickel

**Answer: A**



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**32.** Wilhem Ostwald redefined the action of

A. Anomes

B. Isomers

C. Catalysts found in organism

D. Geometry of monomers

**Answer: C**



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**33.** Which of the following factors are responsible for the increase in the rate of a surface catalysed reaction

1. A catalyst provides proper orientation for the reactant molecules to react.
2. Heat of adsorption of reactants on a catalyst helps



reactant molecules of overcome activation energy.

3. The catalyst increases thhe activation energy of the reaction.

4. Adsorption increases thhe local concentration of reatant molecules on the surface of the catalyst

Select the correct answer using the code given below:-

A. 1 and 2

B. 1 and 3

C. 2 and 4

D. 1,2 and 4

**Answer: D**



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**34.** The efficiency of an enzyme in catalysing a reaction is due to its capacity

- A. to form a strong enzyme-substrate complex
- B. to decrease the bond energies of substrate molecule
- C. to change the shape of the substrate molecule
- D. to lower the activation energy of the reaction.

**Answer: D**



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**35.** Shape selective catalysis is a reaction catalysed by

A. Zeolites

B. Enzymes

C. Platinum

D. Zeigler-Natta catalyst

**Answer: A**



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**36.** In petrochemical industry , alcohols are directly converted to gasoline by passing over heated :-

A. Platinum

B. ZSM-5

C. Iron

D. Nickel

**Answer: B**



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**37.** Which of the following types of metal form the most efficient catalysts?

A. Alkali metals

B. Alkaline earth metals

C. Transition metals

D. All of these

**Answer: C**

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**38.** Which one of the following statements is correct in reversible reaction A catalyst

- A. Increases the rate of forward reaction
- B. Decreases the rate of forward reaction
- C. Increases the rate of backward and forward reaction
- D. Alters the equilibrium constant of the reaction

**Answer: C**





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39. in the Ostwald's process for the manufacture of  $HNO_3$ , the catalyst used is

A. Mo

B. Fe

C. Ni

D. Pt

**Answer: D**



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40. Which is used as autocatalyst:-

A.  $Al_2O_3$

B.  $CaC_2$

C.  $MnSO_4$

D. All of these

**Answer: C**



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**41.** Which one of the following statements is incorrect about enzyme catalysis?

A. Enzymes work best at an optimum temperature

B. Enzymes work at an optimum pH

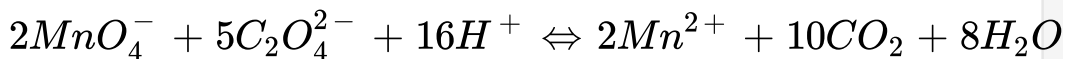
C. Enzymes are highly specific for substances

D. An enzyme raises activation energy

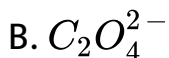
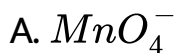
**Answer: D**

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**42.** In the redox reaction



the ion acting as autocatalyst is





**Answer: D**

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**43.** Protons accelerate the hydrolysis of esters . This is an example os :

- A. A geterogenous catalysis
- B. An acid-base catalysis
- C. A promater
- D. A negative catalyst

**Answer: B**

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**44.** Addition of catalyst in a system

- A. Increases equilibrium concentrations
- B. No effect on equilibrium concentrations
- C. Decreases equilibrium concentrations
- D. Increases rate of forward reaction and decreases rate of backward reaction.

**Answer: B**



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**45.** Mark the correct statement in a reversible reaction.

- A. The catalyst catalysis the forward reaction
- B. The catalyst catalysis the backward reaction
- C. The catalyst influences the direct and the reverse reaction to the same extent
- D. The catalyst increases the rate of forward reaction and decreases the rate of backward reaction.

**Answer: C**



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**46.** What is the role of a catalyst in a catalysed reaction

- A. Lowers the activation energy

B. Increases the activation energy

C. Affects the free energy change

D. Affects the enthalpy change

**Answer: A**



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**47.** Platinised asbestos helps in the formation of  $SO_3$  from  $SO_2$  and  $O_2$ . But, if even a small amount of  $As_2O_3$  is present the platinised asbestos does not help in the formation of  $SO_3$ ,  $As_2O_3$  acts here as *a/an*.

A. A positive catalyst

B. A negative catalyst

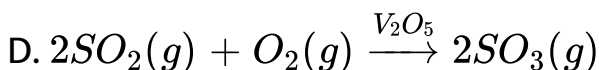
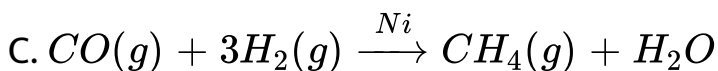
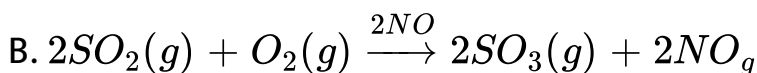
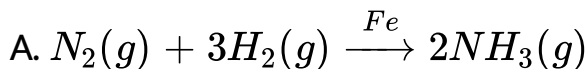
C. An autocatalyst

D. A poison

**Answer: D**

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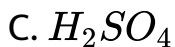
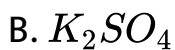
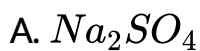
**48.** Amongst the following chemical reactions, the one representing homogeneous catalysis is



**Answer: B**

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**49.** Hydrolysis of ethyl acetate is catalysed by aqueous



**Answer: C**

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50. which of the following reaction is catalysed by enzyme maltase?

A. Starch  $\rightarrow$  maltose

B. Maltose  $\rightarrow$  glucose

C. Lactose  $\rightarrow$  maltose

D. Maltose  $\rightarrow$  glucose+fructose

**Answer: B**



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51. For the study of catalytic reaction who was awarded noble prize

A. Ostwald

B. Berzilius

C. Vant Hoff

D. Werner

**Answer: A**



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**52.** A catalyst remains unchanged at the end of the reaction regarding:

A. Mass

B. Pysical state



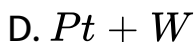
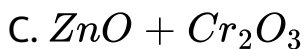
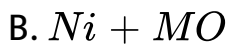
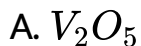
C. Physical state and chemical composition

D. Mass and chemical composition

**Answer: D**

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**53.** The catalyst used in the manufacture of methanol from water gas is:-



**Answer: C**

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**54.** The phenomenon of negative catalysis is

- A. Autocatalysis
- B. Induced catalysis
- C. Inhibition
- D. Enzyme catalysis

**Answer: C**

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55. The transition metal used as a catalyst is

A. Nickel

B. Platinum

C. Cobalt

D. All of these

**Answer: D**



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56. Formation of ammonia from  $H_2$  and  $N_2$  by Haber's process using  $Fe$  is an example of

A. Heterogenous catalysis

B. Homogenous catalyst

C. Enzyme catalysis

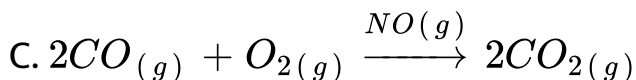
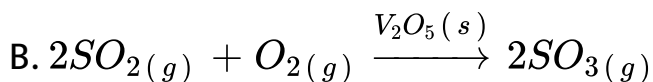
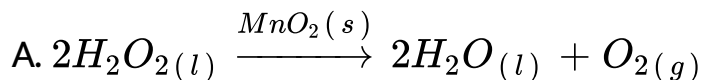
D. Non-catalytic process

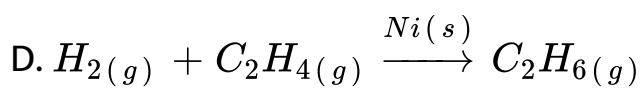
**Answer: A**



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57. Which of the following reactions is an examples of homogeneous catalysis ?





**Answer: C**

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**58.** Enzyme activity is maximum at

A. 300K

B. 310K

C. 320 K

D. 330 K

**Answer: B**

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59. In the titration between oxalic acid and acidified potassium permanganate, the manganous salt formed catalyses the reaction. The manganous salt is:-

- A. A promoter
- B. A positive catalyst
- C. An autocatalyst
- D. None of these

**Answer: C**



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60. An example of autocatalysis is

- A. Oxidation of NO to  $NO_2$
- B. Oxidation of  $SO_2$  to  $SO_3$
- C. Decomposition of  $KClO_3$  to  $KCl$  and  $O_2$
- D. Oxidation of oxalic acid by acidified  $KMnO_4$

**Answer: D**



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61. When a catalyst is added to a system the

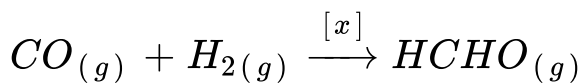
- A. Value of equilibrium constant is decreased

- B. The rate of forward reaction is increased and that of backward reaction is decreased
- C. Equilibrium concentration are unchanged
- D. Equilibrium concentrations are increased

**Answer: C**

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**62.** Name the catalyst [X] for the reaction,



A. *Ni*

B. *Cu*



C.  $Cu / ZnO$

D.  $Cu / Cr_2O_3$

**Answer: B**

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**63.** An example of autocatalytic reaction is

A. The decomposition of nitroglycerine

B. Thermal decomposition of  $KClO_3$  and  $MnO_2$   
mixture

C. Break down of  ${}_{6}C^{14}$

D. Hydrogenation of vegetable oil using nickel catalyst

**Answer: A**

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**64.** Which of the following statements is true for a catalyst

- A. It increases the energy of the reactant
- B. it decreases the energy of the products
- C. It decreases the energy of the reactants
- D. It does not change the enthalpy of the reactants

**Answer: D**

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**65.** In a Homogenous catalysis:-

- A. the catalyst and the reactants should be gases
- B. The catalyst and the reactants should form a single phase
- C. Catalyst and the reactants are all solids
- D. The catalyst and the reactions are all liquids.

**Answer: B**



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**66.** Assertion: A catalyst is more effective in finely divided form.

Reason: Finely divided form has more surface area.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. if both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: A**



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**67. (A)** A reaction cannot become fast by itself unless a catalyst is added .

**(R)** A catalyst always increases the speed of a reaction.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. if both assertion and reason are true but reason is not the correct explanation of the assertion.
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: D**



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**68.** Assertion: ZSM-5 is used as a catalyst in petrochemical industries.

Reason: Zeolites are three dimensional network Silicates

in which some silicon atoms are replaced by aluminium atoms.

A. if both assertion and reason are true and the reason is the correct explanation of the assertion.

B. if both assertion and reason are true but reason is not the correct explanation of the assertion.

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

**Answer: B**



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1. If the dispersed phase is a liquid and the dispersion medium is a solid, the colloid is known as:-

A. A sol

B. An emulsion

C. A gel

D. A foam

**Answer: C**



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2. Gold number is a measure of the

A. Protective action by a lyophilic colloid on a lyophobic colloid

B. Protective action by a lyophobic colloid on a lyophilic colloid

C. Number of mg of gold in a standard red gold sol  
Stability of gold sol

D.

**Answer: A**



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3. When excess of electrolyte is added to a colloid it :



- A. Coagulates
- B. precipitates
- C. Gets diluted
- D. Do not change

**Answer: A**



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4. The purification of the colloidal particles from crystalloid dimensions through semipermeable membrane is known as:

- A. Coagulation
- B. Dialysis

C. Ultrafiltration

D. Peptisation

**Answer: B**

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5. Size of colloidal particle varies from

A.  $10^{-9}$  to  $10^{-7}$  m

B.  $10^{-17}$  to  $10^{-9}$  m

C.  $10^{-7}$  to  $10^{-5}$  m

D.  $10^{-10}$  to  $10^{-4}$  m

**Answer: A**



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6. At the critical micelle concentration, the surfactant molecules :

- A. decompose
- B. Dissoiciate
- C. Associate
- D. Become completely soluble

**Answer: C**



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7. Which of the following is used for the destruction of colloids

- A. Dialysis
- B. Condensation
- C. By ultrafiltration
- D. By adding electrolyte

**Answer: D**



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8. An example of an associated colloid is:-

- A. Milk

B. Soap solution

C. Rubber latex

D. Vegetable oil

**Answer: B**



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

A. Urea

B. Deodecyl trimethyl ammonium chloride

C. Pyridinium chloride

D. Glucose

**Answer: B**

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10. The surface tension of which of the following liquid is maximum?

A.  $H_2O$

B.  $C_6H_6$

C.  $CH_3OH$

D.  $C_2H_5OH$

**Answer: A**

**11.** Gold number is

- A. The number of mg of lyophilic colloid which should be added to 10 ml of ferric hydroxide sol so as to prevent its coagulation by the addition of 1 ml of 10% sodium chloride solution
- B. The number of mg of lyophilic colloid which should be added to 10 ml of standard gold sol so as to prevent its coagulation by the addition of 1 ml of 10% NaCl

C. The mg of gold salt to be added to a lyophilic colloid to coagulate it

D. The mg of gold salt to be added to a lyophilic colloid

**Answer: B**

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**12.** Which property of colloids is not dependent on the change on colloidal particles?

A. Electro-osmosis

B. Tyndall effect

C. Coagulation



## D. Electrophoresis

**Answer: B**

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**13. Fog is colloidal solution of:-**

A. Liquid in gas

B. Gas in liquid

C. Solid in gas

D. Gas in gas

**Answer: A**

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14. The coagulation values in millimoles per litre of the electrolytes used for the coagulation of  $As_2S_3$  are given below

I.  $(NaCl) = 2$

II.  $(BaCl_2) = 0.69$

III.  $(MgSO_4) = 0.22$

A. IIIgtIgtII

B. IgtIIgtIII

C. IIgtIgtIII

D. IIIgtIIgtI

**Answer: D**



15. Which of the following is not the property of hydrophilic solutions ?

A. High concentrations of dispersed phase can be easily attained

B. Coagulation is reversible

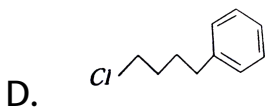
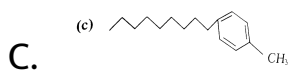
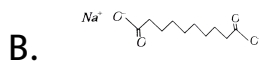
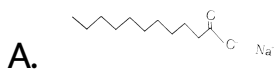
C. Viscosity and surface tension are about the same as for water

D. The charge of the particle depends on the pH values of the medium, it may be positive, negative or even zero

Answer: C

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16. Which of the following molecules is most suitable to disperse benzen in water?



Answer: D

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17. which of the following is a lyophobic colloid ?

A. Aqueous starch solution

B. Aqueous protein solution

C. Gold sol

D. Polymer solvent in some organic solvents

**Answer: A**



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18. Milk is an example of :

A. Pure solution

B. Gel

C. Emulsion

D. Suspension

**Answer: D**



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**19. Light scattering takes place in:**

A. Solutions of electrolyte

B. Colloidal solution

C. Electrodialysis

D. Electroplating

**Answer: B**

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20. Bredig's arc method cannot be used to prepare colloidal solution of which of the following

A. Pt

B. Fe

C. Ag

D. Au

**Answer: D**

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21. "The greater the charge on an ion, the greater its coagulating power" is a statement of

- A. Tyndall's
- B. Faraday's law
- C. Mosley's law
- D. Hardy-Schulze law

**Answer: D**



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22. a negatively charged suspension of clay in water will need for precipitation the minimum amount of



A. Aluminium chloride

B. Potassium sulphate

C. Sodium hydroxide

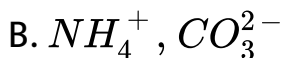
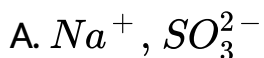
D. Hydrochloric acid

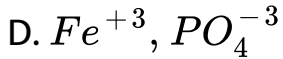
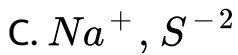
**Answer: A**



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**23.** Which of the following pair (s) of ions would be expected to form precipitate when dilute solutions are mixed?





**Answer: D**

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**24.** Explain the following :

(a) Same substance can act both as colloids and crystalloids.

(b) Artificial rain is caused by spraying salt over clouds.

A. Particle composition

B. Particle size

C. Concentration

D. Ionic character

**Answer: B**

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25. Tyndall effect in colloidal solution is due to

A. Reflection of light

B. Refraction of light polarisation of light

C. Scattering of light

D.

**Answer: D**

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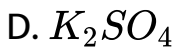
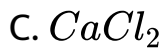
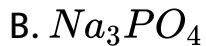
26. the stability of lyophilic colloids is due to

- A. Charge on their particles
- B. A layer of dispersion medium on their particles
- C. The smaller size of their particles
- D. The large size of their particles

**Answer: B**

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27.  $As_2S_3$  sol has a negative charge. Capacity to precipitate it is highest in



**Answer: A**



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**28.** Which of the following substance gives a positively charged sol?

A. Gold

B. A metal sulphite

C. Ferric hydroxide

D. An acidic dye

**Answer: C**

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**29.** Which one is a colloid solution?

A. Sugar solution

B. Urea solution

C. Silicic acid

D. NaCl solution

**Answer: C**



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30. The colloidal solution of gelatin is known as :

- A. Solvent loving sol
- B. Reversible sol
- C. Hydrophilic colloids
- D. All of these

**Answer: D**



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31. Suspensions are :

- A. Visible to naked eye
- B. Invisible through microscope
- C. Not visible by any means
- D. Invisible under electron microscope

**Answer: A**



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**32. Suspensions are :**

- A. Colloids
- B. Crystalloids
- C. Electrolytes



D. Non-electrolytes

**Answer: B**

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**33.** Smoke is an example of

- A. Gas dispersed in liquid
- B. Gas dispersed in solid
- C. Solid dispersed in gas
- D. solid dispersed in solid

**Answer: C**

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**34.** Which of the following method is not employed for the purification of colloids?

A. Dialysis

B. Ultrafiltration

C. Wavelength

D. Brownian movement

**Answer: C**



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**35.** Tyndall phenomenon is exhibited by

- A. NaCl solution
- B. Starch solution
- C. Urea solution
- D.  $FeCl_3$  solution

**Answer: B**



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**36.** The random motion of colloidal particles in the dispersion medium is known as

- A. Electro-osmosis
- B. electrophoresis

C. Brownian movement

D. Tyndall effect

**Answer: C**



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37. \_\_\_\_\_ are granular structures first observed under electron microscope as dense particles by \_\_\_\_\_ (1955).

A. Light scattered by colloidal particles

B. Size of colloidal particles

C. Shape of colloidal particles

D. Relative size of the colloidal particles

**Answer: A**

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**38. Milk is**

- A. Dispersel fats in oil
- B. Dispersed fats in water
- C. Dispersed water in fats
- D. Dispersed water in oil

**Answer: B**

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39. Which of the following forms a hydroxide highly soluble in water?

A. NaCl solution

B. Glucose

C. Starch

D. Barium nitrate

**Answer: C**



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40. Purification of colloids is done by the process of

A. Electrophoresis

B. Electrodispersion

C. Peptization

D. Ultra-filtration

**Answer: B**



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**41.** Fog is a colloidal system of :-

A. Liquid dispersed in gas

B. Gas dispersed in gas

C. solid dispersed in gas

D. Gas dispersed in liquid

**Answer: A**

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**42.** A colloidal solution can be purified by the following method :

- A. Filtration
- B. Peptization
- C. Coagulation
- D. Dialysis

**Answer: D**

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43. Detergents often contain

A.  $\text{RCOONa}$

B.  $\text{RONa}$

C.  $\text{RSNa}$

D.  $\text{ROSO}_2\text{Na}$

**Answer: A**



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44. A synthetic detergent is a

A. Cleansing agent

B. Drug

C. Catalyst

D. Vitamin

**Answer: A**



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**45.** which characteristic is true in respect of colloidal particle?

A. They always have two phases

B. They are only in liquid state

C. They can't be electrolysed

D. They are only hydrophilic

**Answer: A**

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**46.** Colour of colloids depend on which of the following factors

A. Size

B. Mass

C. Charge

D. Nature

**Answer: A**



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47. An emulsion is a colloidal solution consisting of :

A. Solid

B. Liquid

C. Gas

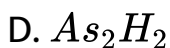
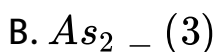
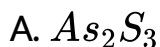
D. Medium

**Answer: B**



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48. Which of the following colloids are formed when hydrogen sulphide gas is passed through a cold solution of arsenious oxide?



**Answer: A**



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49. If gold number of  $A$ ,  $B$ ,  $C$ , and  $D$  are 0.005, 0.05, 0.5 and 5 respectively, then which of the following will have the highest protective power

A. A

B. B

C. C

D. D

**Answer: A**



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50. Butter is a colloid formed when :

- A. Fat is dispersed in solid casein
- B. Fat globules are dispersed in water
- C. Water is dispersed in fat
- D. Casein is suspended in  $H_2O$

**Answer: C**



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**51.** Tyndall effect in colloidal solution is due to

- A. Trace out the path of strong beam of light
- B. Coagulate
- C. Show electrophoresis

D. Show brownian movement

**Answer: A**

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52. On adding few drops of dilute  $HCl$  or  $FeCl_3$  to freshly precipitated ferric hydroxide a red coloured colloidal solution is obtained. The phenomenon is known as

A. Peptization

B. Dialysis

C. Protective action

D. Dissolution



**Answer: A**

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**53.** Surface water contains.

- A. Salt
- B. Salt and organic compound
- C. Organic compounds
- D. Suspended impurities

**Answer: D**

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54. Gold number is associated with :

- A. Amount of gold
- B. Protective colloids
- C. Purple of cassius
- D. Electrophoresis

**Answer: B**



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55. The coagulation of  $200\text{mL}$  of a positive colloid took place when  $0.73\text{gHCl}$  was added to it without changing the volume much. The flocculation value of  $\text{HCl}$  for the

colloid is

a. 36.5 , b. 100 , c. 200 , d. 150

A. 0.365

B. 36.5

C. 100

D. 150

**Answer: C**

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**56.** The number of moles of lead nitrate needed to coagulate 2 mole of colloidal  $[AgI]I^-$  is :

A. 2

B. 1

C. 1/2

D. 2/3

**Answer: B**



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**57.** In a electrical field, the particles of a colloidal system move towards cathode. The coagulation of the same sol is studied using  $K_2SO_4(I)$ ,  $Na_3PO_4(II)$ ,  $(K_4[Fe(CN)_6](III)$  and  $NaCl(IV)$ . Their coagulating power should be :

A.  $I > II > III > IV$

B. IIIgtIIgtIgtIV

C. IIIgtIgtIIgtIV

D. IVgtIIIgtIgtII

**Answer: B**



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**58.** The dispersed phase and dispersion medium in soap lather are respectively :

A. Gas and liquid

B. Liquid and gas

C. Solid and gas

D. solid and liquid

**Answer: A**

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**59.** Butter is a colloid formed when :

A. A gel

B. An emulsion

C. A sol

D. Not a colloid

**Answer: A**

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**60.** Assertion(A): The micelle formed by sodiumm stearate in water has  $-COO$  groups at the surface.

Reason(R): Surface tension of water is reduced by addition of stearate.

- A. True solution
- B. A suspension
- C. An emulsion
- D. A colloidal solution

**Answer: D**



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61. Which of the following is a correct statement:-

A. Surface tension of a liquid decreases with increase in temperature

B. Vapour pressure of a liquid decreases with increase in temperature

C. Viscosity of a liquid decreases with decrease in temperature

D. The boiling point of a liquid is independent of the altitude of the place

**Answer: A**



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62. Which one is an example of gel

A. Soap

B. Cheese

C. Milk

D. Fog

**Answer: B**



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63. Colloidal solutions of metals like Cu, Ag, Au and Pt are generally prepared by using .

A. Peptization

B. Bredig's are method

C. Exchange of solvent

D. oxidation method

**Answer: B**



**Watch Video Solution**

**64.** Which is a natural colloidal

A. Sodium chloride

B. Urea

C. Canesugar

D. Blood

**Answer: D**



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**65.** A clear solution which is again converted into colloidal solution, the process is called

- A. Peptization
- B. Electro addition
- C. Electrophoresis
- D. None of these

**Answer: D**



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**66.** Colloidal solutions are purified by dialysis.

(r) In the process of dialysis, colloidal particles pass through parchment paper.

- A. Solvent loving sol
- B. Dispersed phase
- C. Ions of electrolytes
- D. Particles of dispersion medium

**Answer: C**



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**67.** The colloidal solutions of gold prepared by different methods have different colors due to :

- A. variable valency of gold
- B. different concentration of gold particles
- C. Different types of impurities
- D. Different radius of colloidal particles

**Answer: D**



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**68.** Some substances behave as electrolytes in dilute solutions and as colloids in their concentrated solutions.

Their colloidal forms are said to form

A. Emulsions

B. Gels

C. Micelles

D. Sols

**Answer: C**

 [View Text Solution](#)

**69.** Which of the following is not a method of preparation of colloidal solution

A. Electrical dispersion

B. Peptization

C. Coagulation

D. Mechanical dispersion

**Answer: C**



**View Text Solution**

70. The gold numbers of some colloidal solutions are given below :

Colloidal Solution	Gold number
<i>A</i>	0.01
<i>B</i>	2.5
<i>C</i>	20

The projective powers of these colloidal solutions follow the order :

A. CgtBgtA

B. AgtBgtC

C. A=B=C

D. BgtAgtC

**Answer: B**



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**71. Select wrong statement:-**

A. If a very small amount of  $AlCl_3$  is added to gold sl, coagulation occurs, but if a large quantity of  $AlCl_3$  is added, there is no coagulation



B. Organic ions are more strongly adsorbed on charged surfaces in comparison to inorganic ions

C. Both emulsifier and peptising agents stabilise colloids but their actions are different

D. Colloidal solutions are thermodynamically stable

**Answer: A**

 [View Text Solution](#)

72. According to Hardy Schultz rule, correct order of flocculation value for  $Fe(OH)_3$  sol is :

A. Macro-molecular colloid

B. Multi-molecular colloid

C. Micelles

D. Negative colloid

**Answer: B**



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**73.** To coagulate gelatin sol, which of the following is most effective ?

A.  $NaCl$

B.  $Na_3PO_4$

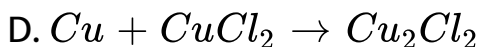
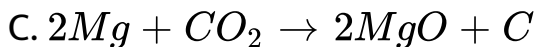
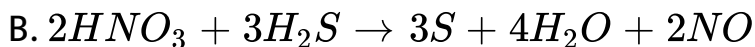
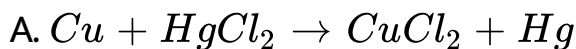
C.  $AlCl_3$

D. Alcohol

**Answer: D**

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74. Which of the following reactions leads to the formation of a substance in the colloidal state?



**Answer: B**



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75. Gold number is minimum in case of.....

- A. Gelatin
- B. Egg albumin
- C. Gum arabic
- D. Starch

**Answer: B**



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76. Flocculation value is expressed in terms of

A. Millimole per litre

B. Mole per litre

C. Gram per litre

D. Mole per millilitre

**Answer: A**



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**77.** If the dispersed phase is a solid and the dispersion medium is a liquid, then colloidal system is known as a/an.

A. Sol

B. Aerosol

C. Organosol

D. Aquasol

**Answer: D**

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**78.** The dispersion medium in aerosol is.....

A. Dispersion of a solid or liquid in a gas

B. Dispersion of a solid in a liquid

C. Dispersion of a liquid in a liquid

D. Solid solution

**Answer: A**



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79. Gelatin is mostly used in making ice cream in order to

- A. Prevent making of colloid
- B. To stabilise the colloid and prevent crystallisation
- C. To stabilise mixture
- D. To enrich the aroma

**Answer: B**



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80. on addition of 1 ml solution of 10 %  $NaCl$  to 10 ml gold sol in the presence of 0.25g of strach, the coagulation is just prevented. Strach has the following gold number

A. 0.025

B. 0.25

C. 0.5

D. 250

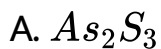
**Answer: D**



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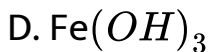


81. which one of the sols acts as protective colloid ?



B. Gelatin

C.  $Au$



**Answer: B**



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82. colloidal solution of arsenious sulphide is coagulated by

A. Addition of electrolyte

B. Addition of non-electrolyte

C. Addition fo solid  $As_2S_3$

D. None of these

**Answer: A**



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**83.** surface tension of lyophilic sols is

A. Lower than that of  $H_2O$

B. More than that of  $H_2O$

C. Equal to that of  $H_2O$

D. None of these

**Answer: A**



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**84.** A colloidal system having a solid substance as a dispersed phase and a liquid as a dispersion medium is classified as ..... .

- A. Foam
- B. Sol
- C. Aerosol
- D. Emulsion

**Answer: A**



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85. Which of the following unstable at room temperature

:-

A. Dialysis

B. Addition of electrolyte

C. Addition of alcohol

D. Addition of alcohol and electrolyte both

**Answer: D**



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86. For coagulating  $As_2S_3$  colloidal sol, which of the following will have the lowest coagulation value

A. NaCl solution

B. KCl

C.  $BaCl_2$

D.  $AlCl_3$

**Answer: D**



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87. In which of the following Tyndall effect is not observed

A. Suspensions

B. Emulsions

C. Sugar solution

D.  $AlCl_3$

**Answer: C**



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**88.** which of the following is a lyophobic colloid ?

A. Milk

B. Gum

C. Fog

D. Blood

**Answer: B**

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**89.** Which of the following is most effective in coagulating a ferric hydroxide sol ?

A.  $KCl$

B.  $KNO_3$

C.  $K_2SO_4$

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

**Answer: D**

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90. Blood is purified by :

A. Dialysis

B. Electro-osmosis

C. Coagulation

D. Filtration

**Answer: A**



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91. Colloidal particles of soap sol in water are

A. negatively charged



B. neutral

C. Positively charged

D. Unpredictable

**Answer: A**



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**92.** An example of colloidal sol in which the affinity of the sol particles for the medium is due to hydrogen bonding is

A. Sulphur in water

B. Gold in water

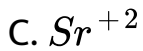
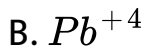
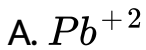
C.  $Fe(OH)_3$  in water

D. Protein in water

**Answer: D**

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93. Which of the following has maximum value of flocculating power?



**Answer: D**

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94. which one of the following is lyophilic colloid ?

A. Gelatin

B. Sulphur

C. gold

D. Carbon

**Answer: A**

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95. Which of the following are hydrophobic sols?

A. Starch solution

B. Gum solution

C. Protein solution

D. Arsenic solution

**Answer: D**



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**96.** An emulsifier is a substance which :

A. Stabilises the emulsion

B. homogenises the emulsion

C. Coagulates the emulsion

D. Accelerates the dispersion of liquid in liquid

**Answer: A**

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97. Which one of the following is not used for preparing lyophilic sols ?

A. Starch

B. gum

C. gelatin

D. Metal sulphide

**Answer: D**

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98. Which of the following is not an emulsion

A. Butter

B. Ice cream

C. Milk

D. Cloud

**Answer: D**

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99. On addition of one ml of 10% NaCl solution of 10ml gold sol in the presence of 0.25 gm of starch. The coagulation is just prevented, starch had gold number

A. 0.025

B. 0.25

C. 2.5

D. None

**Answer: D**



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100. Sulphur colloid is prepared by

A. mechanical dispersion

B. Oxidation

C. Electrical dispersion

D. Reduction

**Answer: B**



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**101.** Which is the wrong pair

(i) starch solution: sol

(ii) Aq NaCl: True solution

(iii). Milk: emulsion

(iv). Aq  $BaSO_4$ : true solution



A. (i)

B. (iii)

C. (iv)

D. (ii)

**Answer: C**



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**102.** Is the gold number of hydrophilic colloid, greater is its protective power.

A. Higher

B. Lower

C. Constant

D. None of these

**Answer: B**



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**103.** Milk can be preserved by adding a few drops of

A. Formic acid solution

B. Formaldehyde solution

C. Acetic acid solution

D. Acetaldehyde solution

**Answer: B**



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**104.** Which one of the following is not a colloidal solution:-

A. Smoke

B. Ink

C. Air

D. Blood

**Answer: C**



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**105.** Buffer is a colloidal solution of:-

A. solid-solid

B. liquid-solid

C. solid-liquid

D. gas-solid

**Answer: B**



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**106.** Luminosity observed as a result of scattering of light by particles is observed in

A. Suspensions

B. Colloidal solution

C. True solution

D. None of these

**Answer: B**



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**107.** Sodium lauryl sulphate is a :

A. Cationic sol

B. Anionic sl

C. Neutral sol

D. None of these

**Answer: A**



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108. Alum helps in purifying water by

- A. Forming Si complex with clay particles
- B. Sulphate part which combines with the dirt and removes it
- C. Aluminium which coagulates the mud particles
- D. Making mud water solution

**Answer: C**



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109. The dispersed phase in colloidal iron (III) hydroxide and colloidal gold is positively and negatively charged respectively with of the following statement is not correct ?

A. Magnesium chloride solution coagulates, the gold sol more readily than the iron (III) hydroxide sol

B. Sodium sulphate solution causes coagulation in both sols

C. Mixing the sols has no effect

D. Coagulation in both sols can be brought about by electrophoresis

**Answer: C**



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110. 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.  $\frac{V_C}{V_S} \cong 1$

B.  $\frac{V_C}{V_S} \cong 10^{23}$

C.  $\frac{V_C}{V_S} \cong 10^{-3}$

D.  $\frac{V_C}{V_S} \cong 10^3$

**Answer: D**



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111. Gold numbers of protective colloids A,B,C and D are 0.05, 0.01, 1.10 and 0.005 respectively. The correct order of their protective powers is

A.  $C < B < D < A$

B.  $A < C < B < D$

C.  $B < D < A < C$

D.  $D < A < C < B$

**Answer: B**



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112. Continous phase contains dispersed phase throughout Example is

A. Water in milk

B. Fat in milk

C. Water droplets in mist

D. Oil in water

**Answer: B**



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**113.** Whipped cream is an example of

A. Dispersion medium    Dispersed phase  
(a) Gas                      Liquid

B. Dispersion medium    Dispersed phase  
(a) Liquid                      Gas

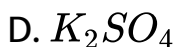
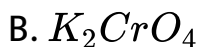
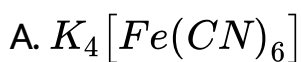
C. Dispersion medium    Dispersed phase  
(a) Liquid                      Liquid

D.	Dispersion medium	Dispersed phase
(a)	Liquid	Solid

**Answer: B**

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**114.** Which of the following electrolytes is least effective in causing flocculation of ferric hydroxide sol?



**Answer: C**



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115. The natural semipermeable membrane is:

A. Phenol laye

B.  $Ca_3(PO_4)_2$

C.  $Cu_2[Fe(CN)_6]$

D. All of these

Answer: C



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**116.** The passing of solvent particles through semipermeable membrane is called:

- A. Molecules of solvent
- B. Complex ions
- C. Simple ions
- D. Molecules of solute

**Answer: A**



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**117.** Paste is

- A. Suspension of solid in a liquid

B. Mechanical dispersion of a solid in liquid

C. Colloidal solution of a solid in solid

D. None of these

**Answer: A**



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**118.** Cod liver oil is derived from

A. An emulsion

B. Solution

C. Colloidal solution

D. Suspension

**Answer: A**



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**119.** Muddy water can be purified through coagulation using

A. Common salt

B. Alum

C. Sand

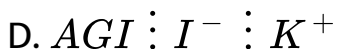
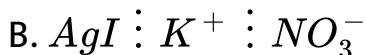
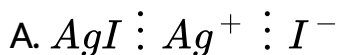
D. Lime

**Answer: B**



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120. When an excess and a very dilute aqueous solution of KI is added to a very dilute aqueous solution of silver nitrate, the colloidal particles of silver iodide which are associated with the Helmholtz double layer:-



**Answer: A**



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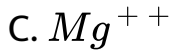
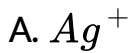
121. According to Hardy Schultz rule, correct order of flocculation value for  $Fe(OH)_3$  sol is :

- A. Adsorption of hydroxyl ion
- B. Adsorption of hydrogen ion
- C. Adsorption of ferric acid
- D. Adsorption of ferric ion

**Answer: D**

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122. Which of the following ions can cause coagulation of protons ?



**Answer: A**



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**123.** Pick out the statement which is not relevant in the discussion of colloids

A. Sodium aluminium silicate is used in the softening of hard water

B. Potash alum is used in shaving rounds and as antiseptic in medicine

C. Artificial rain is caused by throwing electrified sand on the clouds from an aeroplane

D. Deltas are formed at a place where the river pours its water into the sea

**Answer: A**



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124.  $As_2S_3$  sol is ,

A. magnesium nitrate

B. Potassium nitrate

C. Potassium sulphate

D. Aluminium nitrate

**Answer: D**



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**125.** Which of the following anions will have minimum flocculation value for the ferric oxide solution?

A.  $NaCl$

B.  $Na_2S$

C.  $(NH_4)_3PO_4$

D.  $K_2SO_4$

**Answer: A**

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**126.** The basic principle of cotterell precipitator is

- A. Neutralisation of charge on colloidal particles
- B. Scattering of light
- C. Le-chatelier's principle
- D. Peptization

**Answer: A**

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127. The function of  $Fe(OH)_3$  in the contact process is

- A. to detect colloidal impurity
- B. To remove moisture
- C. To remove dust particles
- D. To remove arsenic impurity

**Answer: D**



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128. Which one of the following does NOT involve coagulation:-

- A. Formation of delta regions
- B. peptization
- C. Treatment of drinking water by potash alum
- D. Clotting of blood by the use of ferric chloride

**Answer: B**

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**129.** Artificial rain is caused by spraying :

- A. is easy to spray at high altitudes
- B. Is easy to synthesize
- C. Has crystal structure similar to ice

D. Is insoluble in water

**Answer: C**

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**130.** All colloidal solutions show :

- A. Very high osmotic pressure
- B. Low osmotic pressure
- C. No osmotic pressure
- D. High osmotic pressure

**Answer: B**

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**131.** Size of colloidal particle is

A. 1 nm

B. 1-100 nm

C.  $>100$  nm

D.  $>1000$  nm

**Answer: B**



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**132.** Toilet soap is a mixture of

- A. Calcium and sodium salts of fatty acids
- B. Fatty acids and glycerol
- C. Sodium salts of fatty acids
- D. Potassium salt of fatty acids

**Answer: D**



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**133.** Sulphur sol contains :

- A. discrete sulphur atoms
- B. Discrete sulphur molecules
- C. Large aggregates of sulphur molecules

D. Water dispersed in solid sulphur

**Answer: C**

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**134.** When freshly precipitated  $Fe(OH)_3$  is shaken with aqueous solution of  $FeCl_3$ , a colloidal solution is formed.

The process is known as :

- A. Coagulation
- B. Peptization
- C. Electrodispersion
- D. Dialysis

**Answer: B**

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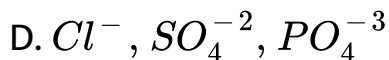
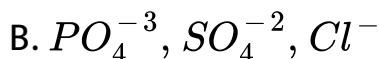
**135.** Which of the following is the best protective colloid?

- A. Gelatin (Gold no=0.005)
- B. Gum arabic (Gold No.=0.15)
- C. Egg albumin (Gold No.=0.08)
- D. None of these

**Answer: A**

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136. The coagulating power of electrolytes having ions  $Na^{\oplus}$ ,  $Al^{3+}$  and  $Ba^{2+}$  for arsenic sulphide sol increases in the order

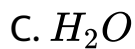
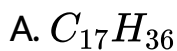


**Answer: C**



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137. Which of the following represents surfactant molecule ?



D. None of these

**Answer: B**



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**138.** The colloidal solutions of gold prepared by different methods have different colors due to :

A. The difference in the size of the colloidal particles

- B. The fact that gold exhibit a variable valency of +1 and +3
- C. Different concentrations of gold
- D. Presence of different types of foreign particles depending upon the method of preparation of the colloid

**Answer: A**



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**139.** The decomposition of  $H_2O_2$  can be checked by addition of

A. Promoter

B. Inhibitor

C. Detainer

D. Stopper

**Answer: B**



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**140.** Which statement comparing the soap sodium stearate, and the detergent sodium lauryl sulfate is not true ?

A. It has a non-polar organic part and a polar group

B. It is not easily bidegraded



C. It is a sodium salt of fatty acid

D. It is a surface active agent

**Answer: C**

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**141.** Which of the following has minimum gold number ?

A. Gelatin

B. Starch

C. Albumin

D. Blood

**Answer: A**



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142. Gold number is maximum for the lyophilic sol is

- A. Gelatin
- B. Haemoglobin
- C. Sodium oleate
- D. Potato starch

**Answer: D**



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**143.** The minimum concentration of an electrolyte required to cause coagulation or flocculation of a sol is called its flocculation value. It is expressed in

- A. Peptization value
- B. Gold number
- C. Avagadro's number
- D. Flocculation value

**Answer: B**



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**144.** Lyophilic sols are more stable than lyophobic sols because

- A. The colloidal particles have positive charge
- B. The colloidal particles have no charge
- C. The colloidal particles are solvated
- D. There are strong electrostatic repulsions between the negatively charged colloidal particles

**Answer: C**



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**145.** Oils and fats are obtained by saponification potassium stearate. Its formula is  $CH_3 - (CH_2)_{16} - COO - K^+$ . Lyophobic end of atom is  $(CH_3)$  and lyophilic end is  $COO - K^+$ . Potassium stearate is example of

- A. Lyophobic colloids
- B. Lyophilic colloids
- C. Polymolecular colloids
- D. Combined colloids or Micelles

**Answer: D**

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146. Which of the following statement is wrong for lyophobic sol

- A. Dispersed phase is generally in organic material
- B. Can be easily coagulated by small addition of electrolyte
- C. Dispersed phase particles are poorly hydrated and colloid is stabilised due to charge on the colloidal particle
- D. Reversible in nature that is after coagulation can be easily set into colloidal form

**Answer: D**



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**147.** Which of the following statement is not true for a lyophobic sol

- A. it can be easily solvated
- B. It carries charge
- C. The coagulation of this sol is irreversible in nature
- D. It is less stable in a solvent

**Answer: A**



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**148.** Ferric hydroxide sol is positively charged colloid. The coagulating power of  $NO_3^-$ ,  $SO_4^{2-}$  and  $PO_4^{3-}$  ions would be in the order



**Answer: C**



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**149.** The detergency action of soap is due to its :



A. Emulsification properties

B. Hydrolysis

C. Ionization

D. High molecular weight

**Answer: A**



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**150.** Lyophobic colloids are :

A. Insoluble in water

B. In solution do not pass through filter paper

C. Of definite size of particles

D. Separated from crystalloids by parchment paper

**Answer: D**

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**151.** Colloidal solution cannot be obtained from two such substances which are

- A. Insoluble in each other
- B. In same physical state
- C. In different physical state
- D. None of these

**Answer: D**



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152. The emulsifying agent in milk is

A. Lactic acid

B. Casein

C. Lactose

D. Fat

**Answer: B**



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**153.** The colloidal solution of mercury in water can be easily obtained by:-

- A. Mechanical precipitation
- B. Bredig's arc method
- C. Repeated washing
- D. Ultrasonic dispersion

**Answer: D**



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**154.** Give two differences between lyophilic and lyophobic colloids.

A. Particle size

B. Behaviour towards dispersion medium

C. Filtrability

D. None of these

**Answer: B**



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**155.** In colloidal particles, the range of diameter is :

A. Increases

B. Decreases

C. Remains unaffected

D. First increases then decreases

**Answer: A**

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**156.** Given one example each of 'oil water' and 'water oil' emulsion.

A. Butter

B. Milk

C. Cream

D. Face cream

**Answer: A::C**

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**157.** The shape of colloidal particles is:-

A. Sphere like

B. Rod like

C. Disc like

D. All of these

**Answer: D**

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**158.** which of the following is a hydrophilic colloidal sol?

A. Barium hydroxide sol

B. Arsenic sulphide sol

C. Starch solution

D. Silver chloride sol

**Answer: C**



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**159.** Lyophilic sols are

A. Covalent bond

B. Vander Waal's force

C. Hydrogen bond



D. None of these

**Answer: C**

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**160.** Emulsifiers are generally :-

A. Soap

B. Synthetic detergents

C. Lyophilic sols

D. All of these

**Answer: D**

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**161.** Mildness of shaving cream is enriched by which one of the following ?

A. Liquid

B. Gas

C. Solid

D. None of these

**Answer: A**



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**162.** The minimum quantity of sodium chloride which is necessary to precipitate 10 liters of sol in two hours in 0.585 gm. The flocculation value of sodium chloride is:-

A. 0.585

B. 0.0585

C. 0.1

D. One

**Answer: D**



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**163.** Which one is an example of micellar system?

A. Soap+water

B. Protein+water

C. Rubber+benzene

D.  $As_2O_3 + Fe(OH)_3$

**Answer: A**



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**164.** Tyndall effect is shown by

A. Hydrophilic sols

B. Hydrophobic sols

C. Starch solution

D. Both b and c

**Answer: B**



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**165.** White of an egg is partly coagulated by heating which can be again obtained back by some pepsin and little HCl.

This process is called

A. Peptization

B. Coagulation

C. Precipitation

D. None of these

**Answer: A**

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**166.** Tyndall effect is shown by :

- A. Charge on the colloidal particle
- B. Osmotic pressure of colloidal solution
- C. Difference between the refractive indices of dispersed phase and dispersion medium
- D. Size of colloidal particles

**Answer: C**

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**167.** The example of heteropolar sol. is

- A. Starch sol in water
- B. Rubber sol in water
- C. Protein sol in water
- D. It is not very stable in a solvent

**Answer: C**



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**168.** Which of the following statements is not true for a lyophilic sol.

- A. it can be easily solvated
- B. it carries no charge
- C. Coagulation of this sol is reversible in nature
- D. It is not very stable in a solvent

**Answer: D**



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**169.** At high concentration of soap in water, soap behaves as .....

- A. Foam
- B. Gel



C. Gas

D. Air

**Answer: B**



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**170.** Gold number is the index for

A.  $AuCl_3$

B.  $NaCl$

C.  $AlCl_3$

D.  $FeCl_3$

**Answer: B**



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171. The impurities present in rain water possess .....charge.

A. Positive

B. Negative

C. Zero

D. Positive and negative

**Answer: B**



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172. Which of the following statement is false

A. Every solid substance can be brought into colloidal state

B. Colloidal particles carry electrical charges

C. Every solid substance can be made to behave like a lyophilic colloid

D. Addition of electrolytes causes flocculation of colloidal particles

**Answer: C**



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173. Colloidal solution of gold cannot be prepared by

- A. Bredig's are method
- B. Mechanical dispersion
- C. Reduction of gold chloride
- D. Echange of solvents

**Answer: D**



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174. Which of the following can stabilize gold sol from coagulation by NaCl solution:-

- A.  $Fe(OH)_3$

B. Gelatin

C.  $As_2S_3$

D. None of these

**Answer: B**



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**175.** At isoelectric point

A. Colloidal sol becomes highly stable

B. Precipitation of a colloidal sol takes place

C. Colloidal particles becomes uncharged

D. Peptization can be carried out

**Answer: C**

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**176.** Which one is an example of multimolecular colloid system

- A. Soap dispersed in water
- B. Protein dispersed in water
- C. Reactive hydrogen
- D. Atomic hydrogen

**Answer: C**

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**177.** Metals like platinum and palladium can adsorb large volumes of hydrogen under special conditions. Such adsorbed hydrogen by the metal is known as

- A. Occluded hydrogen
- B. Absorbed hydrogen
- C. Reactive hydrogen
- D. Atomic hydrogen

**Answer: A**



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**178.** Which of the following can act as protective colloids?

A. Hydrophobic sol

B. hydrophilic sol

C. Gold sol

D. None of these

**Answer: B**



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**179.** Which of the following are hydrophobic sols ?

A. Reversible

B. Irreversible

C. Unstable



D. None of these

**Answer: A**

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**180.** Soaps essentially form a colloidal solution in water and remove the greasy matters by :

A. Absorption

B. Emulsification

C. Coagulation

D. None of these

**Answer: B**



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**181.** 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**



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**182.** Peptizing agent is

- A. Always an electrolyte
- B. Always a non-electrolyte
- C. Electrolyte or non-electrolyte
- D. A lyophilic colloid

**Answer: A**



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**183.** Assertion: Deep electric shock cause death of an animal

Reason: Electric shock coagulate the blood.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: A**



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**184.** Assertion: Sky appears blue colour.

Reason: Colloidal particles of dust scatter blue light.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: A**

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**185.** Assertion : The micelle formed by sodium stearate in water has  $-COO^-$  groups at the surface.

Reason : Surface tension of water is reduced by the addition of stearate.

A. if both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

**Answer: B**



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**186.** Assertion: Aqueous gold colloidal solution is red in colour.

Reason: The colour arises due to scattering of light by colloidal gold particles.

A. If both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

**Answer: A**



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187. Assertion:  $Fe^{3+}$  can be used for coagulation of  $As_2S_3$  sol.

Reason:  $Fe^{3+}$  reacts with  $As_2S_3$  to give  $Fe_2S_3$ .

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: C**



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**188.** Assertion: The conversion of fresh precipitate to colloidal state is called peptization.

Reason: It is caused by addition of common ions.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: B**



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**189.** Assertion: Colloidal solution exhibit Tyndall effect while true solution particles.

Reason: Because the size of the colloidal particles is large enough to scatter light as compared to size of the true solution particles.

- A. if both assertion and reason are true and the reason is the correct explanation of the assertion.
- B. If both assertion and reason are true but reason is not the correct explanation of the assertion
- C. If assertion is true but reason is false.
- D. If the assertion and reason both are false.

**Answer: A**

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**190.** Statements : The stability of lyophobic sol is lesser than lyophilic sol .

Explanation : Lyophilic sol possess loving nature for liquid .

A. if both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

**Answer: B**



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**191.** Assertion : Colloidal sol scatters light while true solution does not.

Reason : The particles in a colloidal sol move slowly than in a true solution.

A. if both assertion and reason are true and the reason is the correct explanation of the assertion.

B. If both assertion and reason are true but reason is not the correct explanation of the assertion

C. If assertion is true but reason is false.

D. If the assertion and reason both are false.

**Answer: B**

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**192.** On which of the following properties does the coagulating power of an ion depend?

A. The magnitude of the charge on the alone

B. Size of the ion alone

C. Both magnitude and sign of the charge the ion

D. The sign of charge on the ion alone

**Answer: C**



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### Critical Thinking Objective Question

1. coagulation is the process by which the dispersed phase of a colloid is made to aggregate and thereby separate from the continuous phase. The minimum concentration of an electrolyte in milli-moles per litre of the electrolyte solution which required to cause the coagulation of colloidal sol is called coagulation value .

therefore higher is the coagulating power of effective ion, smaller will be the coagulation value of the electrolyte.

the ability of an ion to bring about coagulation of a given colloid depends upon :

- A. Its size
- B. The magnitude of its charge only
- C. The sign of its charge only
- D. The sign of its charge

**Answer: D**

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2. Which of the following forms cationic micelles above certain concentration ?

A. Urea

B. Cetyltrimethylammonium bromide

C. Sodium dedecyl sulphate

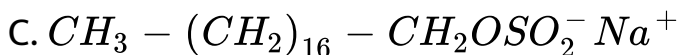
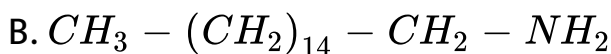
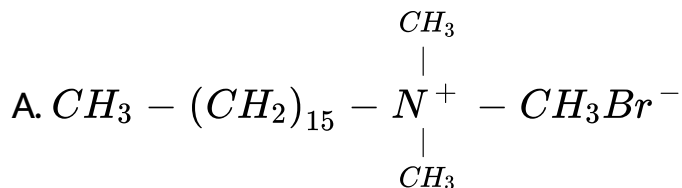
D. Sodium acetate

**Answer: B**

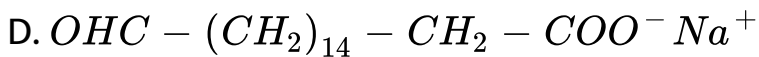


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**3. Which one of the following is not a surfactant?**







**Answer: B**

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4. Which of the following is contributed towards the extra stability of lyophilic colloids?

- A. Hydration
- B. Charge
- C. Colour
- D. Tyndal effect

**Answer: A**

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5. Which is not colloidal?

A. Chlorophyll

B. Egg

C. Ruby glass

D. Milk

**Answer: A**

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6. Which of the following methods is used for sol destruction?

A. Condensation

B. Dialysis

C. Diffusion through animal membrane

D. Addition of an electrolyte

**Answer: D**



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7. The density of gold is  $19\text{g}/\text{cm}^3$ . If  $1.9 \times 10^{-4}\text{g}$  of gold is dispersed in one litre of water to give a sol having

spherical gold particles of radius 10 nm then the number of gold particles per  $mm^3$  of the sol will be:

A.  $1.9 \times 10^{12}$

B.  $6.3 \times 10^{14}$

C.  $6.3 \times 10^{10}$

D.  $2.4 \times 10^6$

**Answer: D**



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**8.** Which of the following is not represented by sols?

A. Absorption

B. Tyndall effect

C. Flocculation

D. Paramagnetism

**Answer: D**



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**9. Gold number gives**

A. The amount of gold present in the colloid

B. the amount of gold required to break the colloid

C. The amount of gold required to protect the colloid

D. None of these

**Answer: D**

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10. The surface tension of a soap solution is  $30 \times 10^{-3} \text{Nm}^{-1}$ . The work done in stretching a bubble of this solution of surface area  $5\text{cm} \times 5\text{cm}$ , to an area of  $10\text{cm} \times 10\text{cm}$ , is

A.  $4.5 \times 10^{-4} \text{J}$

B.  $6.0 \times 10^{-4} \text{J}$

C.  $4.5 \times 10^{-5} \text{J}$

D.  $7.5 \times 10^{-4} \text{J}$

**Answer: A**



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11. Point out the false statement

- A. Brownian movement and Tyndall effect is shown by colloidal system
- B. Gold number is a measure of the protective power of a lyophilic colloid
- C. The colloidal solution of a liquid in liquid is called gel
- D. Hardy-Schulze rule is related with coagulation

**Answer: C**



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12. Which one of the following is an incorrect statement for physisorption

- A. It is a reversible process
- B. It requires less heat of adsorption
- C. It requires activation energy
- D. It takes place at low temperature

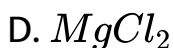
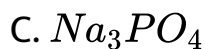
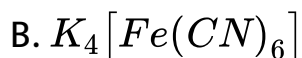
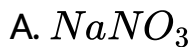
**Answer: C**



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13. Which of the following electrolytes is most effective in the coagulation of gold solution?



**Answer: B**



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14. Identify the gas which is readily adsorbed by activated charcoal?

A.  $N_2$

B.  $SO_2$

C.  $H_2$

D.  $O_2$

**Answer: B**



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**15.** Cloud bursts due to :

A. Attraction towards the electrical charges on the earth

B. Large amount of water present in the cloud

C. Dense clouds are present in upper atmosphere

D. Mutual discharge of opportunity charged clouds  
resulting in the coagulation.

**Answer: D**



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**16.** The smog is essentially caused by the presence of :

A.  $O_2$  and  $O_3$

B.  $O_2$  and  $N_2$

C. Oxides of sulphur and nitrogen

D.  $O_3$  and  $N_2$

**Answer: C**

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17. An example of intrinsic colloid is :

A. Glue

B. Sulphur

C. Fe

D.  $As_2S_3$

**Answer: A**

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**18.** Chlorine atoms catalyse the decomposition of ozone in the layers of earth's atmosphere and thus causing heating. This Cl comes from:-

- A. Teflon
- B. Chlorofluorocarbon
- C. Chloroform
- D. Pyrene

**Answer: B**

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**19.** The capacity to bring about coagulation increases with

- A. Ionic radii
- B. Atomic radii
- C. Valency of an ion
- D. Size of an ion

**Answer: C**



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**20.** which of the following does not contain a hydrophobic structures.

- A. Linseed oil
- B. Lanolin

C. Glycogen

D. Rubber

**Answer: D**

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**21.** The function of gum arabic in the preparation of Indian ink is

A. Coagulation

B. Peptization

C. Protective action

D. Absorption

**Answer: C**



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**22.** Colloidal gold can be prepared by ,

- A. disinfectant
- B. Anticancer agent
- C. Germ killer
- D. Tonic to raise vitlity of human system

**Answer: D**



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1. A catalyst is a substance which

A. Increases the rate of the forward reaction

B. Decreases the value of enthalpy change in the reaction

C. Reduces the time required for reaching the equilibrium state in the reaction

D. Decreases the rate of the reverse reaction

**Answer: C**



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2. A catalyst :

- A. Increases the average kinetic energy of reacting molecules
- B. Increases the activation energy
- C. Alters the reaction mechanism
- D. Increases the frequency of collisions of reacting species

**Answer: C**



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3. Movement of colloidal particles under the influence of electrostatic field is

A. Electrophoresis

B. Electrolysis

C. Dialysis

D. Ionisation

**Answer: A**



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4. Rate of physisorption increases with :

A. Decrease in temperature

B. Increase in temperature

C. Decrease in pressure

D. Decrease in surface area

**Answer: A**



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5. Adsorption of gases on solid surface is generally exothermic because :

A. Enthalpy is positive

B. Entropy decreases

C. Entropy increases

D. Free energy increases

**Answer: B**



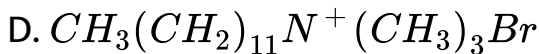
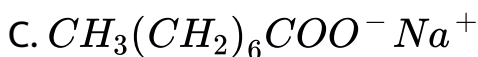
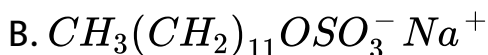
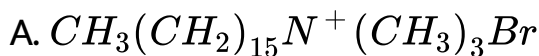
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6. Lyophilic sols are more stable than lyophobic sols because

- A. Irreversible sols
- B. They are prepared from inorganic compound
- C. Coagulated by adding electrolytes
- D. Coagulated by adding electrolytes

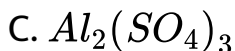
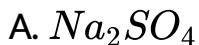
**Answer: D**

7. Among the following the surfactant that will form micelles in aqueous solution at the lowest molar concentration at ambient condition is :



**Answer: B**

8. 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



**Answer: C**



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9. Methylene blue, from its aqueous solution is adsorbed on activated charcoal at  $25^\circ C$ . For this process, the

correct statement is

- A. The adsorption requires activation at  $25^{\circ}C$
- 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**



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**10.** The coagulating power of electrolytes having ions  $Na^{+}$ ,  $Al^{3+}$  and  $Ba^{2+}$  for arsenic sulphide sol increases



in the order :-

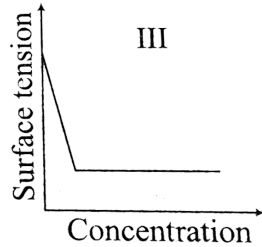
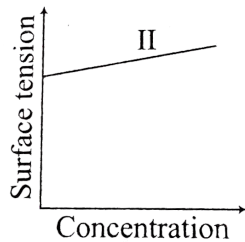
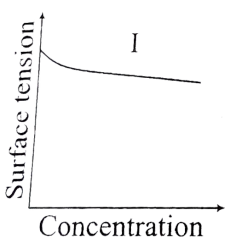


**Answer: B**



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**11.** The equalitative sketches I, II and III given below show the variation of surface tension with molar concentration of three different aqueous solutions of  $KCl$ ,  $CH_3OH$  and  $CH_3(CH_2)_{11}OSO_3^- Na^+$  at room temperature.



The correct assignment of the sketches is

A. I:  $KCl$

II:  $CH_3OH$

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

II:  $CH_3OH$

C. I:  $KCl$

I:  $CH_3(CH_2)_{11}OSO_3^- Na^+$

III:  $CH_3OH$

D. I:  $CH_3OH$

II:  $KCl$  III:  $CH_3(CH_2)_{11}OSO_3^- Na^+$

**Answer: D**



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**12. Which of the following is an anionic detergent ?**

- A. Sodium lauryl sulphate
- B. Cetyltrimethyl ammonium bromide
- C. Bglyceryl oleate
- D. Sodium stearate

**Answer: A**



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13. 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.  $1/n$  appears as the intercept
- B. Only  $1/n$  appears as the slope
- C.  $\log (1/n)$  appears as the intercept
- D. Both k and  $1/n$  appear in the slope term

**Answer: B**



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14. 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. (ii) and (iv)

B. (i) and (iii)

C. (ii) and (iii)

D. (i) and (iv)

**Answer: A**





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15. Peptization is a process of :

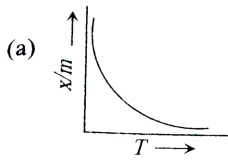
- A. Precipitating colloidal particles
- B. Purifying colloidal particles
- C. dispersing the precipitate into colloidal state
- D. None of these

**Answer: C**

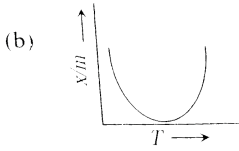


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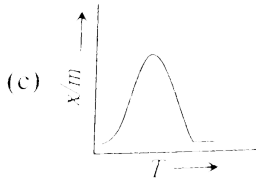
16. Which plot is the adsorption isobar for chemisorption?



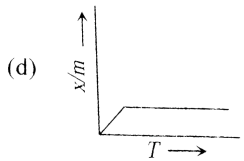
A.



B.



C.



D.

**Answer: C**

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**17. Physical adsorption is :**

A. Highly specific

B. Reversible sol

C. Irreversible

D. Monolayer

**Answer: B**



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**18. Zeolites are :-**

A. Water softener

B. Catalyst

C. Both a and b



D. None of these

**Answer: C**

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

- A. The blood starts flowing in the opposite direction
- B. The blood reacts and a solid is formed which seals the blood vessel
- C. The blood is coagulated and the blood vessel is sealed

D. The ferric chloride seals the blood vessel

**Answer: C**



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20. The degree of protection of a lyophobic colloid by the addition of a lyophilic colloid is measured in terms of :

- A. Gold number
- B. Coagulation value
- C. Sedimentation
- D. None of these

**Answer: A**

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21. Medicines are more effective if they are used in :

A. Colloidal state

B. Solid state

C. solution state

D. None of these

**Answer: A**

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22. The detergency action of soap is due to its :

A. Emulsifying property

B. Mecellisation

C. Both a and b

D. Solubility in water

**Answer: C**



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**23.** The function of alcohol addition in stroing chloroform

is :

A. To act as negative catalyst

B. To retard the oxidation of  $CHCl_3$

C. To react with  $COCl_2$  if formed

D. All of these

**Answer: D**



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**24.** Ultramicroscope works on the principle of :

A. Light reflection

B. Light absorption

C. Light scattering

D. Light polarisation

**Answer: C**



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25. The colloidal solutions of gold prepared by different methods have different colors due to :

- A. difference in the size of colloidal particles
- B. the fact that gold exhibits variable valency
- C. Different concentration of gold
- D. Presence of different types of foreign particles

**Answer: A**



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

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

**Answer: A::B::D**



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**27.** Choose the correct reason(s) for the stability of the lyophobic colloidal particles.

- A. Preferential adsorption of ions of 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



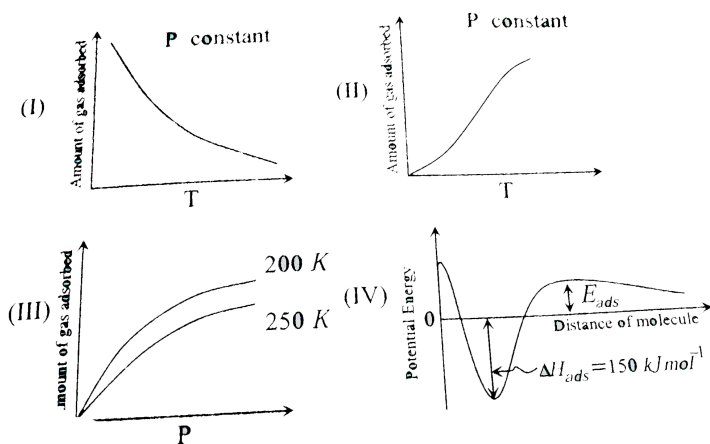
D. Potential difference between the fixed layer and the diffused layer of opposite charges around the colloidal particles

**Answer: A::D**

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**28.** The given graphs/data I,II,III and IV represent general trends observed for different physisorption and chemisorption process for different physisorption and chemisorption process under mild conditions of temperature and pressure. Which of the following

choice(s) about, I,II,III and IV is(are) correct



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

**Answer: A::C**

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29. When  $O_2$  is adsorbed on a metallic surface, electron transfer occurs from the metal to  $O_2$ . The true statement(s) regarding this adsorption is (are)

- A.  $O_2$  is physisorbed
- B. Heat is released
- C. Occupancy of  $\pi_{2p}^*$  of  $O_2$  is increased
- D. Bond length of  $O_2$  is increased

**Answer: B::C::D**



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30. The correct statement(s) about surface properties is (are)

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

**Answer: A:C**

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31. 1 mole of  $AgI / Ag^+$  sol is coagulated by

- A. 1 mol of KI
- B. 500 mL of 1M  $K_2SO_4$
- C. 300 mL of 1M  $Na_3PO_4$  solution
- D. 1 ml of AgI

**Answer: A::B::D**

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32. Which of the following is (are) colloid (s) ?

A. smoke

B. Ruby glass

C. Pumic stone

D. Chlorophyll

**Answer: A::B::C**



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**33.** Which of the following are correct statements

A. Hardy-Schulze 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 lyophobic colloid

**Answer: A::B::D**



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**34.** Colloidal solution can be purified by :

A. Dialysis electrodialysis

B. Electrophoresis

C. Ultrafiltration

D.

**Answer: A::B::D**



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**35. Coagulation of colloids can be achieved by :**

- A. Centrifugation
- B. Adding electrolyte
- C. Change in pH
- D. Adding water

**Answer: A::B::C**



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36. When negatively charged colloids like  $As_2S_3$  sol is added to positively charged  $Fe(OH)_3$  sol in suitable amounts

- A. Both the sols are precipitated simultaneously
- B. This process is called mutually coagulation
- C. They becomes +vely charged colloid
- D. They become -vely charged colloid

**Answer: A::B**

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37. Which of the following are based on Tyndall effect.

- A. Ultramicroscope
- B. Deltas
- C. Blue colour of sky
- D. Coagulation

**Answer: A::C**



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**38.** The origin of charge on colloidal solution is

- A. Frictional rubbing
- B. Electron capture during bredig's arc method
- C. Selective adsorption of ion on their surface

D. It is due to addition of protective colloids

**Answer: A::B::C**



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**39.** Which of the following is positively charged colloidal particle ?

A.  $Al(OH)_3$

B.  $SnO_2$

C. Haemoglobin

D. Gold

**Answer: A::B::C**



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40. Which of the following are negative colloids ?

A. Gold

B. Sulphur

C.  $As_2S_3$

D. Basic dyes

**Answer: A::B::C**



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41. Which of the following is not lyophilic

A. Gelatin sol

B. Silver sol

C. Sulphur sol

D.  $As_2S_3$  sol

**Answer: B::C::D**



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**42.** Which of the following is a protective colloid?

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 coagulating power

D. Lower the coagulation value, higher the coagulating power

**Answer: B::D**

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**43.** Which of the following statements about physical adsorption is correct ?

A. Adsorption increases with increase in temperature

B. Adsorption is spontaneous

C. Both enthalpy and entropy of adsorption are negative

D. Adsorption on solid is reversible.

**Answer: B::D**

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**44.** An example of micelle is

A. Sodium stearate

B. Sodium lauryl sulphate

C. Sodium alkyl benzene sulphonate

D. Sodium benzoate

**Answer: A::B::C**

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**45.** Which of the following statement/s is/are not correct

A. Physical adsorption is directly related to the critical temperature of the gas (adsorbate)

B. One gram of charcoal at  $25^{\circ}C$  will always adsorb the same amount of a particular gas at a particular pressure

C. At particular temperature, adsorption always increases with increase of pressure



D. In adsorption, the concentration of adsorbate is always greater at the surface of the adsorbent

**Answer: B::C::D**

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**46.** The correct statement about adsorption are

- A. the chemisorption of  $H_2$  as  $H$  atoms on the surface of glass is endothermic
- B. Physical adsorption does not require activation energy
- C. Chemisorption is always unimolecular

D. In adsorption, only solute from the solution is adsorbed on the surface of the solid adsorbent

**Answer: A::B::C**

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## Jee Section Reasoning Question

1. Assertion (A): Micelles are formed by surfactant molecules above the critical micellization concentration ( $CMC$ ).

Reason(R): The conductivity of a solution having surfactant molecules decreases sharply at the  $CMC$ .

- A. Statement 1 is true, statement 2 is true, statement 2 is a correct explanation for statement 1
- B. Statement 1 is true, statement 2 is true, statement 2 is not a correct explanation for statement 1
- C. Statement 1 is true, statement 2 is false
- D. Statement 1 is false, statement 2 is true

**Answer: B**



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2. (A) The reaction of oxalic acid with acidified  $KMnO_4$  is first slow and then proceeds with faster speed. (R) Acidified  $KMnO_4$  is a strong oxidising agents.

A. Statement 1 is true, statement 2 is true, statement 2

is a correct explanation for statement 1

B. Statement 1 is true, statement 2 is true, statement

2 is not a correct explanation for statement 1

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

**Answer: B**



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3. Statement-1: All colloidal dispersions give very low osmotic pressure and show very small freezing point depression or boiling point elevation.

Statement-2: Tyndall effect is due to scattering of light from the surface of colloidal particles.

- A. Statement 1 is true, statement 2 is true, statement 2 is a correct explanation for statement 1
- B. Statement 1 is true, statement 2 is true, statement 2 is not a correct explanation for statement 1
- C. Statement 1 is true, statement 2 is false
- D. Statement 1 is false, statement 2 is true

**Answer: B**



4. Assertion: The Brownian movement is due to the bombardment on colloidal particle by the molecules of dispersion medium which are in the constant motion like molecules in a gas.

Reason: Brownian movement provides a visible proof of the random kinetic motion of molecules in a liquid.

A. Statement 1 is true, statement 2 is true, statement 2

is a correct explanation for statement 1

B. Statement 1 is true, statement 2 is true, statement

2 is not a correct explanation for statement 1

C. Statement 1 is true, statement 2 is false

D. Statement 1 is false, statement 2 is true

**Answer: B**

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## Jee Section Passage I

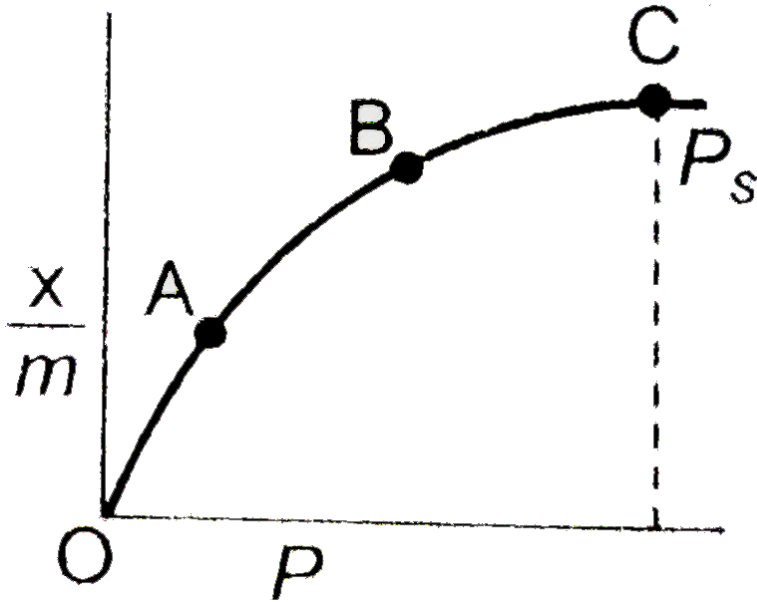
1. A graph between  $x/m$  and the pressure  $P$  of the gas at a constant temperature is called adsorption isotherm.

Where  $x$  is the no. of moles of the adsorbate and  $m$  is the mass of the adsorbent. Adsorption isotherms of different shapes have been experimentally observed. According to Freundlich adsorption isotherm,

$$x/m = KP^{1/n}$$

where  $K$  and  $N$  are constant parameters depending upon the nature of the solid and gas

In the given isotherm select the incorrect statement :



A.  $x/m \propto P^{1/n}$  along OA

B.  $x/m \propto P^\circ$  when point B reached

C.  $x/m$  does not increase as rapidly with pressure along

BC due to less surface area available for adsorption



D. Nature of isotherm is different for two gases for same adsorbent

**Answer: B**

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2. A graph between  $x/m$  and the pressure  $P$  of the gas at a constant temperature is called adsorption isotherm.

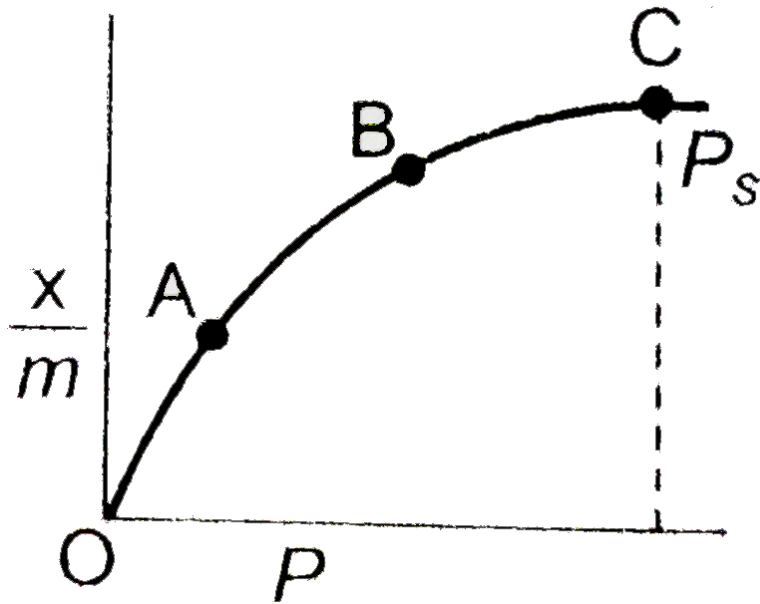
Where  $x$  is the no. of moles of the adsorbate and  $m$  is the mass of the adsorbent. Adsorption isotherms of different shapes have been experimentally observed. According to Freundlich adsorption isotherm,

$$x/m = KP^{1/n}$$

where  $K$  and  $N$  are constant parameters depending upon

the nature of the solid and gas

Inn the given isotherm select the incorrect statement :



A. 0.4

B. 0.6

C. 0.8

D. 0.1

**Answer: B**



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## Jee Section Integer Type Question

1. Silver (atomic weight  $108\text{g mol}^{-1}$ ) has a density of  $10.5\text{g cm}^{-3}$ . The number of silver atoms on a surface of area  $10^{-12}\text{m}^2$  can be expressed in scientific notation as  $Y \times 10^{-x}$ , The value of  $x$  is .....



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2. In an adsorption experiment, a graph between  $\log\left(\frac{x}{m}\right)$  versus  $\log P$  was found to be linear with a slope of  $45^\circ$ . The intercept on the log y axis was found to be 0.301

. Calculate the amount of the gas adsorbed per gram of charcoal under a pressure of 3.0 atm.

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3. The coagulation of  $100\text{mL}$  of a colloidal solution of gold is completely prevented by the addition of  $0.030\text{g}$  of it before adding  $1\text{mL}$  of  $10\%$   $\text{NaCl}$  solution. Find out the gold number of starch?

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4. From the given following sol how many can coagulate silica acid sol?

$Fe(OH)_3$ ,  $Ca(OH)_2$ ,  $Al(OH)_3$ , starch, clay,

$As_2S_3$ ,  $CdS$ , basic dye.

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5. For the coagulation of  $500\text{mL}$  of arsenious sulphide sol,  $2\text{mL}$  of  $1\text{MNaCl}$  is required. What is the flocculation value of  $NaCl$ ?

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## Jee Section Matching Column

1. Match the entries Listed I Column I with appropriate entries Listed in Column II.

Column I	Column II
(A) Lyophilic colloids	(p) Scatter light
(B) Lyophobic colloids	(q) Irreversible in nature
(C) Macromolecular colloids	(r) Can act as protective colloids
(D) Associated colloids	(s) Can act as emulsifiers

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2. Match the entries listed in Column I with appropriate entries listed in Column II.

Column I	Column II
(A) Silicic acid	(p) Forms negatively charged sol
(B) Arsenic sulphide	(q) Forms macromolecular colloid
(C) Gum arabic	(r) Forms lyophobic sol
(D) Gold	(s) Forms a non-elastic gel





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