



## **CHEMISTRY**

# BOOKS - CENGAGE CHEMISTRY (ENGLISH)

# SURFACE CHEMISTRY

Illustration

1. Reversible adsorption is :

<b>2.</b> What is sorption ?	
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**3.** Why are powdered substances more effective adsorbents than their crystalline forms?

**4.** How do size of particles of adsorbent, pressure of gas, and prenvailing temperature influence the extent of adsorption of a gas on a solid?

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#### 5. Why physisorption is multi-molecular

whereas chemisorption is unimolecular ?



6. Compare the heat of adsorption for physical

and chemical adsorption?

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7. In the case of chemisorption, why adsorption first increases and then decreases with temperature?

8. Which will be adsorbed more readily on the

surface of charcoal and why- $NH_3$  or  $CO_2$ ?



10. What is meant by chemisorption?



**13.** Explain the following observations.

a. Sun looks red at the time of sunset.

b. Rate of physical adsorption decreases with

rise in temperature.

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14. How is adsorption of a gas related to its

critical temperature?

**15.** Give any four applications of adsorption.



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

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

**17.** 2.0g of charcoal is placed in 100mL of  $0.05MCH_3COOH$  to form an adsorbed mono-acidic layer of acetic acid molecules and thereby the molarity of  $CH_3COOH$  reduces to 0.49. The surface area of charcoal is  $3 imes 10^2 m^2 g^{-1}$ . The surface area of charcoal is adsorbed by each molecule of acetic acid is a.  $1.0 imes 10^{-18} m^2$  b.  $1.0 imes 10^{-19} m^2$ 

c.  $1.0 imes 10^{13}m^2$  d.  $1.0 imes 10^{-22}m$ 

18. Which of the following statements is not

true?

a. Both physisorption and chemisorption are exothermic.

b. Physisorption occurs with increase of free energy.

c. Physisorption requires low activation energy but chemisorption requires high activation energy.

d. The magnitude of chemisorption increases and that of physisorption decreases with rise in temperature.





**19.** The rate of chemisorption

- a. increaeses with decreases in temperature
- b. increases with increases in tempreture
- c. increases with decreases in the pressure of

gas

d. is independent of the pressure of gas



**20.** Which out of helium and neon would adsorb on the surface of charcoal more readily and why?



21. Adsorption, if spontaneous, is exothermic.

Explain.

**22.** Why is it necessary to remove CO when

ammonia is obtained by Haber's process?

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# **23.** Why is the ester hydrolysis slow in the beginning and becomes faster after sometimes?

24. What do you mean by activity and selectivity of catalysts?
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25. How does BF<sub>3</sub> act as a catalyst in

industrial process?

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**26.** Explain the shape-selective catalysis.





**29.** i. The ability of a catalyst to direct the reaciton to yield particular products is called a. Reactivity b. Selectivity c. Activity d. Fugacity ii. Which of the following Is an example of zeolite?

a. ZSM-5 b.  $AgNO_3$  c.  $Mg(OH)_2$  d.  $Co(OH)_3$ 

(iii) Reactions in zeolite catalyst depends on

a. Pores b. Apertures

c. Size of cavities d. All of these

**30.** Taking two examples of heterogeneously catalyzed reactions, explain how a heterogeneous catalyst helps in the reaction.





**32.** How does the rate of an enzyme-catalyzed reactions vary with (a) temprature and (b) pH? Represent diagrammatically.



#### 33. Give one example of a chemical reaction

involving homogeneous catalyst.



**34.** How does a catalyst work?



**36.** A catalyst lowered the activation energy byh  $25KJmol^{-1}$  at  $25^{\circ}C$  . By how many times

will the rate grow?

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**37.** At 400K , the energy of activation of a reaction is decreased by 0.8Kcal in the presence of catalyst. Hence, the rate will be a. Increased by 2.73 times b. Increased by 1.18 times c. Decreased by 2.72 times

d. Increased by 6.26 times

**38.** for the coagulation of 50 mL of ferric hydroxide sol 10 mL of 0.5 M KCl is required.

What is the coagulation value of KCl?

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**39.** 0.025 gm of starch solution is required to

prevent coagulation of 10 ml gold sol. When 1

ml of

10 % NaCl Solution is present. What is the gold number of starch sol?



**41.** State Hardy schulze rule.



#### **43.** What is Kraft tempreature?



**44.** What is meant by the term peptization ?



**45.** Which one of the following electrolytes is most effective for the coagulation of  $Fe(OH)_3 sol$  and why?

 $NaCl, Na_2SO_4, Na_3PO_4$ 

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**46.** How is dialysis carried out? Mention its one application.



**47.** For the coagulation of 100mL of arsenious sulphite sol, 5mL of 1MNaCl is required. What is the flocculaton value of NaCl?

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**48.** The coagulation of 200mL of a positive colloid took place when 0.73gHCl was added to it without changing the volume much. The

flocculation value of HCl for the colloid is

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



**49.** What is observed when sodium chloride is

added to a colloidal solution of ferric hydroxide?



**50.** Give two examples of colloidal solution of liquid dispersed in solid. What is the name of the colloidal solution?



**51.** The coagulation of 100mL of a colloidal solution of gold is completely prevented by the addition of 0.030g of it before adding 1mL of 10% NaCl solution. Find out the gold number of starch?



**52.** 50mL of standard gold solution needs 0.05mg of gelatin for its protection from coagulation. Calculate the gold number of gelatine?

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53. Why are lyophilic colloidal sols more stable

than lyophobic colloidal sols?

54. What is the difference between a colloidal

solution, gel, and emulsion?



55. What type of colloidal sols are formed in

the following:

a. Sulphur vapours are passed through cooled water.

b. White of an egg is mixed with water.

c. Soap solution.



**56.** A colloidal solution of ferric oxide is prepared by two different methods as shown below.

a. What is the charge on colloidal particles in

the two test tubes (A) and (B)?

b. Give reasons for the origin of charge.

**57.** Explain the following observation:

a. A beam of light passing through a colloidal solution has a visible path.

Passing an electric currenet through a colloidal solution removes colloidal particles from it.

c. Ferric hydroxide sol coagulates on addition of potassium sulphate.



**58.** Compare the coagulation power of  $AlCl_3$  with that of NaCl. Given that their coagulation values are 0.093 and 52 respectively?

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**59.** Compare the coagulating power of HCl with that of KBr. Given the coagulation values are 30.8 and 138, respectively?



60. What modification can you suggest in the

Hardy Schulze, law?

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61. Why is it essential to wash the precipitate

with water before estimating it quantitatively?



#### 63. What type of substances form hydrophobic

sols?



64. Define emulsification?



66. What is the significance of reciprocal of

"gold number"?

**67.** What is common in aquasols and solid aerosols ? Also find the point of distinction between them.

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68. What is colloidion?

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**69.** Define colloidal solution?




**70.** A sol of Agl can be positively or negatively

charged. Explain how and why?



71. Give four uses of emulsions.



72. Give an example of associated colloid.



73. Give one example of positively charged sol

and one example of negatively charged sol.

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74. What is electrodialysis?

**75.** What is the main cause of charge on a colloidal solution?

**O** Watch Video Solution

# **76.** Why do collidal solutions exhibit Tyndall effect?

77. Define the Ultrafiltration



**78.** Which is not the characteristic of hydrophobic sols?

a. They are highly susceptible to coagulation by addition of electrolytes.

b. They have nearly the same surface tensionand viscosity as that of dispersion medium.c. Their stability is due to both electric charge

and salvation of the particles.

d. Sol particles can be seen under ultramicroscope.

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**79.** Hydrophilic gels, when placed in water, absorb liquid resulting in an increases of their volume. This process of swelling of gels takes place with

a. No change in volume

Net increase in volume

c. Net decrease in volume

Large reduction in volume



80. Under the influence of an electric field, the particles in a sol migrate towards cathode. The coagulation of the same sol is studied using  $NaCl, Na_2SO_4$ , and  $Na_3PO_4$  solutions. Their coagulation values will in the order a.  $NaCl > Na_2SO_4 > Na_3PO_4$ b.  $Na_2SO_4 > Na_3PO_4 > NaCl$ 



a. KCl

 $BaCl_2$ 

c.  $Fe_2(SO_4)_3$ 

d.  $Na_3PO_4$ 

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83. The colligative property of a sol compared

to the aqueous solution of glucose of same

concentration will be

a. Much smaller

b. Much higher

c. The same

d. Slightly lower



Illustration 5 36

 Which of the following small-sized elements can repalce silicon and aluminium in the framework at zeolites

a. Boron

- b. Magnesium
- c. Phosphorus

d. All

ii. Zeolites are microporous aluminosilicates

with general formula

a. 
$$Mig[(AlO_2)_xig].\ mH_2O$$
  
b.  $M_xig[AlO_2)_x(SiO_2)_yig]$   
c.  $M_xig[(SiO_2)_yig].\ mH_2O$ 

d. 
$$M_{x / n} \Big[ (AlO_2)_x (SiO_2)_y (SiO_2)_y \Big]$$
.  $mH_2O$ 

iii. The zeolites have shape selectivity

depending on

- a. Pore structure
- b. Atomic structure
- C. Molecular structure
- d. None

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Solved Examples

**1.** What is the difference between multimolecular and macromolecular colloids? Give one example of each.



2. Physical and chemical adsorption respond differenlty with a rise in temperature. What is this difference and why is it so? It brgt



**3.** A small amount of silica gel and anhydrous calcium chloride are placed separately in two corners of a vessel containing water vapour. What phenomena will occur?





4. How is adsorption of a gas related to its

critical temperature?



**5.** Explain the following observation:

a. Lyphilic colloid is more stable than lyophobic colloid.

b. Coagulation takes place when sodium chloride solution is added to a colloidal

solution of ferric hydroxide.

c. Sky appears blue in colour.



6. Give one test to distinguish whether the

given emulsion is oil-in-water-type emulsion.

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**7.** Consider the adsorption isotherm given below and interpret the variation in the extent

of adsorption 
$$\left(rac{x}{m}
ight)$$
 when

a. Temperature increased at constant

pressure.

b. Pressure increases at constant temperature.



# **8.** A colloidal solution of *Agl* is prepared by two different methods as shown in the figure below:





What is the charge of Agl colloidal particles in

the two test tubes (A) and (B) ?

b. Given reasons for the origin of charge.



9. Adsorption and Absorption are same.
True/False?
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**10.** Adsorption, if spontaneous, is exothermic.

Explain.



**11.** In a coagulation experiment, 5mL of  $As_2S_3$ is mixed with distilled water and 0.1Msolution of an electrolyte AB so that the total volume is 10mL. It was found that all solutions sontianing more than 4.6mL . Of AB coagulate within 5 min. What is the flocculation value of AB for  $As_2S_3$  solution?

**12.** In an adsorption experiment, a graph between log  $\left(rac{x}{m}
ight)$  versus log P was found to be linear with a slope of  $45^\circ\,$  . The intercept on the log  $\left(\frac{x}{m}\right)$  axis was found to be 0.3010 . Calculate the amount of the gas adsorbed per gram of charcoal under a pressure of 0.5 atm`. Watch Video Solution

13. The volume of nitrogen gas Vm (at STP) reqired to cover a sample of silica gel with a

monomolecular layer is  $129cm^3g^{-1}$  of gel. Calculate the surface area per gram of the gel if each nitrogen molecule occupies  $16.23 \times 10^{-20}m^2$ .

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**14.** 100mL of a colloidal solution is completely precipitated by addition of 5mL of 1M NaClsolution. Calculate the coagulation value of NaCl. **15.** What is the charge on the colloidal particles in the following ?

- a.  $Fe(OH)_3$  sol
- b.  $As_2S_3$  sol
- c. Colloidal sol of sillver



16. which of the following is most effective in

coagulating ferric hydroxide sol?

a. KCl

b.  $FeCl_3$ 

c.  $Na_2SO_4$ 

d.  $K_3 \big[ Fe(CN)_6 \big]$ 

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**17.** Write a mathematical expression showing relationship between the amount of solute adsorbed per unit mass of the solid adsorbent and the concentration of the solution in the solution.

**18.** In the case of chemisorption, why adsorption first increases and then decreases

with temperature?

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19. Why physisorption is multi-molecular

whereas chemisorption is unimolecular?

**20.** What happens when freshly precipitated  $Fe(OH)_3$  is shaken with small amount of  $FeCl_3$  solution ?



- 1. Expalin the following terms
- a. Adsorption
- b. Adsorbate
- c. Adsorbent



- 2. Consider the adsorption isotherm given below and interpret the variation in the extent of adsorption  $\left(\frac{x}{m}\right)$  when a. Temperature increased at constant pressure.
- b. Pressure increases at constant temperature.



3. How is adsorption of a gas related to its

critical temperature?

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4. Derive the following:

- a. Langmuir iostherm
- b. Freundlich iostherm





6. Which of the two, adsorption or adsorption,

is surface phenomenon?



7. Why are powdered substances more effective adsorbents than their crystalline forms?



8. Discuss different types of adsorption and

their properties.



**9.** The effect of pressure on adsorption is high if

- a. Temperature is low
- b. Temperature is high

Temperature is neither very low nor very high

d. Charcoal piece is taken in place of charcoal powder



**10.** Which one of the following statements is wrong?

a. Physical adsorption of gas directly related to

its critical temperature.

b. Chemical adsorption decreases regularly as

the temperature is increased.

c. Adsorption is an exothermic process.

d. A solid with a rough surface is a better

adsorbent than the same solid with a smooth

surface.

**11.** Which of the following is true during adsorption?

a.  $\Delta G$  ,  $\Delta H$  , and  $\Delta S$  all are negative.

b.  $\Delta G$  is negative, but  $\Delta H$  and  $\Delta S$  is positive.

c.  $\Delta G$  and  $\Delta H$  are negative, but  $\Delta S$  is positive.

d.  $\Delta G$  and  $\Delta S$  are negative, but  $\Delta H$  is positive.







# 2. Give peptization method for preparation of

colloids.

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## **3.** PURIFICATION OF COLLOIDAL SOLUTION

**4.** Describe the electrical properties of colloidal solution.



## 5. What is emulsion? Write its applications.



6. What is demulsification ?



8. Describe the following types of colloids,

giving an examples for each:

a.Multimolecular colloids

b. Macromolecular colloids

**9.** How are the colloidal solutions classified on the basis of physical states of the dispersed phase and dispersion medium?

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10. Zeta potential (or electrokinetic potential)

is the
- 11. Blue colour of the sky is due to
- a. Adsorption of light by dust particles
- b. Reflection of light by dust particles
- c. Scattering of light by dust particles
- d. Pressure of clouds which are a colloidal
- dispersion of water particles in air



**Exercises Subjective** 

1. What happens when persistent dialysis of a

colloidal solution is carried out?

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2. What type of building blocks are present in the structure of zeolites? What is this structure called?,

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**3.** What do x and m represent in the following

expression?

$$\left(rac{x}{m}
ight) = KP^{1/n}$$



# 4. Give one example of a chemical reaction

involving homogeneous catalyst.



5. What type of substances form lyophobic

sols?

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6. How can we remove moisture from glass

apparatus?



7. The gold numbers of protective colloids A, B, C, and D are 0.04, 0.002, 10, and 25, respectively. The protective powers of A, B, C, and D are in the order

A. A > B > C > D

 $\mathsf{B}.\,B > A > C > D$ 

 $\mathsf{C}.\, D > C > A > B$ 

 $\mathsf{D}.\, D > C > B > A$ 

### Answer:



8. When  $6 \times 10^{-5}g$  of a protective colloid was added to 20mL of a standard gold sol, the precipitation of latter was just prevented on addition of 2mL of 10 % NaCl solution. The gold number of a protective colloid is

A. 3

B. 
$$3 imes 10^{-5}$$

C. 0.06

### D. 0.03

# Answer:



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

A. 
$$Cl^{\Theta}$$
, 1.0

 $\mathsf{B.}\,Cl^{\,\Theta}\,,\,2.0$ 

C. 
$$Ba^{2\,+},\,1.0$$

D. 
$$Ba^{2\,+},\,0.5$$

# **Answer:**



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

A. 
$$[SnO_2]K^{\oplus}$$

 $\mathsf{B}.\,[SnO_2]OH^{\,\Theta}$ 

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

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

# Answer:

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# **Exercises Link Comprehension**

**1.** Collidal solution is a heterogeneous solution which contains particle of intermediate size,

i.e., (diameter between 1 and 1000 nm) colloidal is not a substance but it is a state of a substance which depends upon the molecular size. Colloidal solutions are intermediate between ture solution and suspensions.

The size of the colloidal particles lies in the range

- A. 10nm 1000nm
- B.  $10m\mu 1000m\mu$

C. 1nm - 1000nm

D. 
$$10^{-5} cm - 10^{-7} cm$$

## Answer: C

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2. Collidal solution is a heterogeneous solution which contains particle of intermediate size, i.e., (diameter between 1 and 1000 nm) colloidal is not a substance but it is a state of a substance which depends upon the molecular size. Colloidal solutions are intermediate between ture solution and suspensions. The colloidal solution of a solid as the

disperesed phase and a gas as the dispersed

medium is called

A. Sol

B. Sloid foam

C. Aerosol

D. Gel

# Answer: C



3. Collidal solution is a heterogeneous solution which contains particle of intermediate size, i.e., (diameter between 1 and 1000 nm) colloidal is not a substance but it is a state of a substance which depends upon the molecular size. Colloidal solutions are intermediate between ture solution and suspensions.

The colloidal particle can pass through

A. Filter paper as well can pass through

Animal Membrane

B. Animal membrane but not through filter

paper.

- C. Filter paper but not through animal membrane.
- D. Neither filter paper nor animal

membrane.

Answer: C

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4. Collidal solution is a heterogeneous solution which contains particle of intermediate size, i.e., (diameter between 1 and 1000 nm) colloidal is not a substance but it is a state of a substance which depends upon the molecular size. Colloidal solutions are intermediate between ture solution and suspensions.

The difference between a lyophilic and lyophobic colloid is their

A. Behaviour towards dispersion medium

B. Filterability

C. Scattering of light

D. Particle size

Answer: A

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**5.** Collidal solution is a heterogeneous solution which contains particle of intermediate size, i.e., (diameter between 1 and

1000 nm) colloidal is not a substance but it is a state of a substance which depends upon the molecular size. Colloidal solutions are intermediate between ture solution and suspensions.

Chemisorption

A. Increases with temperature

B. Decreases with temperature

C. Remains unaffected by change of

temperature.

D. First increases and then decreases.

# Answer: D



6. A chemist studied the phenomenon of adsorption by putting blood charcoal in KCLsolution. He observed difference in the behaviour with dilute KCL solution and with concentrated KCL solution. He also studied the adsorption of different gases on solid adsorbent and the effect of temperature on adsorption. He put forward a mathematical

relationship relating x/m with equilibrium pressure. Which of the following is correct? A. Adsorption is always exothermic? B. Adsorption is always endothermic. C. Physical adsorption is endothermic whereas chemisorption is exothermic. D. Chemical adsorption is endothermic whereas physical adsorption is

endothermic

# Answer: A



7. A chemist studied the phenomenon of adsorption by putting blood charcoal in KCLsolution. He observed difference in the behaviour with dilute KCL solution and with concentrated KCL solution. He also studied the adsorption of different gases on solid adsorbent and the effect of temperature on adsorption. He put forward a mathematical

relationship relating x/m with equilibrium pressure.

Which of the following plot will be liner? (More than one correct)

A. Plot of log x/m versus P

B. Plot of  $m \, / \, x$  versus  $1 \, / \, P$ 

C. Plot of log  $\displaystyle \frac{P}{m \, / \, m}$  versus P

D. Plot of log  $m \, / \, x$  versus log P

Answer: A::B::C

8. A chemist studied the phenomenon of adsorption by putting blood charcoal in KCLsolution. He observed difference in the behaviour with dilute KCL solution and with concentrated KCL solution. He also studied the adsorption of different gases on solid adsorbent and the effect of temperature on adsorption. He put forward a mathematical relationship relating x/m with equilibrium pressure.

The correct order of the adsorption of gases

will be

A.  $NH_3>SO_2>CO_2>HCl$ B.  $CO_2>SO_2>NH_3>HCl$ C.  $SO_2>NH_3>HCl>CO_2$ 

 $\mathsf{D}.\,HCl > SO_2 > NH_3 > CO_2$ 

Answer: C

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9. A chemist studied the phenomenon of adsorption by putting blood charcoal in KCLsolution. He observed difference in the behaviour with dilute KCL solution and with concentrated KCL solution. He also studied the adsorption of different gases on solid adsorbent and the effect of temperature on adsorption. He put forward a mathematical relationship relating x/m with equilibrium pressure.

Which of the following result is oberved with the experiment of *KCl* solution ?

A. Dilute	KCl	solut	ion shov	vs no		
adsorpt	ion whe	ereas c	oncentrate	ed KCl		
shows adsorption						
B. Concent	rated	KCl	solution	shows		
positive adsorption whereas dilute $KCl$						
solution shows negative adsorption.						
C. Concent	rated	KCl	solution	shows		
positive	adso	rption	whereas	dilute		
shows n	egative	adsorp	otion.			

D. Dilute KCl solution shows positive

adsorption whereas concentrated KCl

solution shows negative adsorption.

Answer: B

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**10.** Collidal dispersion have been classified into different types depending upon the physical state of the dispersed phases and the dispersion medium. They are prepared in the industry or in the laboratory by a number of methods and then purified. The protective action of lyophilic colloids was studied by Zsigmondy and he introduced a term called gold number.

Which of the following does not form a lyophilic colloid?

A. Rubber dissolved in benzene.

B. White or the egg dissolved into water.

C. Common salt added into benzene.

D. Stannous chloride solution added to

gold chloride solution.

Answer: D

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**11.** Substances which alter the velocity of a reaction by mere presence, without undergoing any change in mass and compossition are termed catalyst and the phenomenon is known as catalysis

According to the adsorption theroy of catalysis, the rate of reaction increases because

A.  $Fe(OH)_3$  sol

B.  $As_2S_3$  sol

C. Gold sol

D. Starch sol

Answer: A

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12. Collidal dispersion have been classified into different types depending upon the physical state of the dispersed phases and the dispersion medium. They are prepared in the industry or in the laboratory by a number of methods and then purified. The protective action of lyophilic colloids was studied by Zsigmondy and he introduced a term called gold number.

Criticle micelle concentration (CMC) of saop solution lies in the range.

A. 
$$10^{-6} - 10^{-5}M$$

B.  $10^{-5} - 10^{-4}M$ 

$$C. 10^{-3} - 10^{-2} M$$

D. 
$$10^{-4} - 10^{-3}M$$

# Answer: D

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**13.** Collidal dispersion have been classified into different types depending upon the physical state of the dispersed phases and the dispersion medium. They are prepared in the industry or in the laboratory by a number of methods and then purified. The protective action of lyophilic colloids was studied by Zsigmondy and he introduced a term called gold number. Which of the following will have maximum

flocculation value for aresnic sulphide sol?

A.  $BaCl_2$ 

 $\mathsf{B.}\, NaCl$ 

 $\mathsf{C}.\,KCl$ 

D.  $AlCl_3$ 

# Answer: B



**14.** Collidal dispersion have been classified into different types depending upon the physical state of the dispersed phases and the dispersion medium. They are prepared in the industry or in the laboratory by a number of methods and then purified. The protective action of lyophilic colloids was studied by Zsigmondy and he introduced a term called

gold number.

Which of the following has minimum gold number?

A. Albumen

B. Gelatin

C. Starch

D. Gum arabic

**Answer: B** 

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**15.** Adsorption is the tendency of accumulation of molecular species at the surface of solid or liquid. Depending upon the nature of bonds or forces of attraction between adsorbate and adsorbent. It is classofied between physisorption and chemisorption. Which of the following statements are correct? (More than one correct)

A. Adsorption always leads to a decrease in

enthalpy and entropy of the system.

Answer: A::B::D				
energy.				
D. Adsorption	decreases	the	surf	ace
temperature				
C. Adsorption	increases	with	rise	in
molecules on	the surface	2.		
the enthalpy	of valency f	orce of	atoms	s or
B. Adsorption a	rises due to	unsati	uratior	n in

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**16.** Adsorption is the tendency of accumulation of molecular species at the surface of solid or liquid. Depending upon the nature of bonds or forces of attraction between adsorbate and adsorbent. It is classofied between physisorption and chemisorption. Which of the following gas molecules have maximum value enthalpy of physisorption?

A.  $C_2H_6$ 

 $\mathsf{B.}\,Ne$ 

# D. $H_2O$

### Answer: D

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**17.** Adsorption is the tendency of accumulation of molecular species at the surface of solid or liquid. Depending upon the nature of bonds or forces of attraction between adsorbate and adsorbent. It is classofied between physisorption and chemisorption. Which of the following gases is adsorbed most

by activated charcoal?

A.  $CO_2$ 

B.  $N_2$ 

 $\mathsf{C.}\,Ar$ 

D.  $C_2H_6$ 

Answer: A



**18.** Adsorption is the tendency of accumulation of molecular species at the surface of solid or liquid. Depending upon the nature of bonds or forces of attraction between adsorbate and adsorbent. It is classofied between physisorption and chemisorption. Which of the following characteristics is not correct for physical adsorption?

A. Adsorption is spontaneous.

Β.

C. It is reversible in nature

## D. Degree of adsorption increases with

temperature

### Answer: D

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**19.** Substances which alter the velocity of a reaction by mere presence, without undergoing any change in mass and compossition are termed catalyst and the phenomenon is known as catalysis

According to the adsorption theroy of catalysis, the rate of reaction increases because

A. According to the activation energy of the reaction.

B. Concentration of reactant molecules at

the active centres of the catalyst

becomes high due to adsorption.

C. Adsorption increases the activation

energy of the reaction.

D. Adsorption decreases the activation of

the energy of the reaction.

Answer: B

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**20.** Substances which alter the velocity of a reaction by mere presence, without undergoing any change in mass and compossition are termed catalyst and the phenomenon is known as catalysis

For the reaction (A 
ightarrow B + C) , the energy

profile diagram is given in the figure below.



The decrease in the energy of activation in the presence of catalyst is

### A. Z

B. Z - P

# $\mathsf{C}. Y - Z$

## D. Z - X

### Answer: B

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**21.** Substances which alter the velocity of a reaction by mere presence, without undergoing any change in mass and compossition are termed catalyst and the phenomenon is known as catalysis In homogenous catalytic reactions, there are

three alternative paths A, B, and C (shown in figure). Which one of the following indicates the relative ease with which the reaction can take place?



Reaction coordinate  $\longrightarrow$ 

A. A. B. C

 $\mathsf{B.}\, C > B > A$ 

C. B. C. A

 $\mathsf{D}.\, A=B=C$ 

#### Answer: B

Watch Video Solution

**22.** Substances which alter the velocity of a reaction by mere presence, without undergoing any change in mass and compossition are termed catalyst and the

phenomenon is known as catalysis

Which is incorrect for a catalyst?

A. A catalyst can initiate a reaction.

B. A catalyst remains uncharged in quality

and composition at the end of reaction.

C. It does not alter the position of

equilibrium in a reversible reaction.

D. Catalyst are sometimes very specific in reaction.

Answer: A

23. Only the surface atoms in an adsorbent play an active role in adsorption. These atoms possess some residual force such as van der Waals forces and chemical forces. In the process of adsorption. Weak adsorbate is substituting by strong adsorbete. Activated charcoal used in the gas mask is already exposed to the atmospheric air, so gases and water vapours in air are adsorbed on its surface. When the mask is exposed to chlorine

atmosphere, the gases are displaced by chlorine. In general, easily liquefiable gases such as  $CO_2$ ,  $NH_3$ ,  $Cl_2$ , and  $SO_2$  are adsorbed to a greater extent than the elemental gases, e.g.,  $H_2$ ,  $N_2$ ,  $O_2$ , He, etc. Gas mask works on the principle of

A. Chemical adsorption

B. Physical adsorption

C. Both physical adsorption and chemical

adsorption

D. None of these

## Answer: C



**24.** A chemist studied the phenomenon of adsorption by putting blood charcoal in KCLsolution. He observed difference in the behaviour with dilute KCL solution and with concentrated KCL solution. He also studied the adsorption of different gases on solid adsorbent and the effect of temperature on adsorption. He put forward a mathematical

relationship relating x/m with equilibrium pressure.

Which of the following result is oberved with

the experiment of KCl solution ?

A. Charcoal granules

B. Calcium carbonate

C. Fuller's earth

D. Powdered charcoal

Answer: D

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**25.** A chemist studied the phenomenon of adsorption by putting blood charcoal in KCLsolution. He observed difference in the behaviour with dilute KCL solution and with concentrated KCL solution. He also studied the adsorption of different gases on solid adsorbent and the effect of temperature on adsorption. He put forward a mathematical relationship relating x/m with equilibrium pressure.

Which of the following result is oberved with

the experiment of KCl solution ?

A.  $H_2$ 

 $\mathsf{B.}\,SO_2$ 

C.  $N_2$ 

 $\mathsf{D}.\,O_2$ 

Answer: B



**26.** Only the surface atoms in an adsorbent play an active role in adsorption. These atoms possess some residual force such as van der Waals forces and chemical forces. In the process of adsorption. Weak adsorbate is substituting by strong adsorbete. Activated charcoal used in the gas mask is already exposed to the atmospheric air, so gases and water vapours in air are adsorbed on its surface. When the mask is exposed to chlorine atmosphere, the gases are displaced by chlorine. In general, easily liquefiable gases such as  $CO_2$ ,  $NH_3$ ,  $Cl_2$ , and  $SO_2$  are adsorbed to a greater extent than the elemental gases, e.g.,  $H_2$ ,  $N_2$ ,  $O_2$ , He, etc. Which of the following gases will substitute  $O_2$  from adsorbed charcoal?

A.  $Cl_2$ 

 $\mathsf{B.}\,N_2$ 

 $\mathsf{C.}\,CH_4$ 

D.  $N_2$ 

### Answer: A



27. Only the surface atoms in an adsorbent play an active role in adsorption. These atoms possess some residual force such as van der Waals forces and chemical forces. In the process of adsorption. Weak adsorbate is substituting by strong adsorbete. Activated charcoal used in the gas mask is already exposed to the atmospheric air, so gases and water vapours in air are adsorbed on its surface. When the mask is exposed to chlorine atmosphere, the gases are displaced by chlorine. In general, easily liquefiable gases such as  $CO_2$ ,  $NH_3$ ,  $Cl_2$ , and  $SO_2$  are adsorbed to a greater extent than the elemental gases, e.g.,  $H_2$ ,  $N_2$ ,  $O_2$ , He, etc. In physical adsorption, the forces associated are

A. lonic

B. covalent

C. van der Waals

D. `H-bonding

## Answer: C



**28.** Emulsions are also called the colloidal solutions in which the disperse phase as well as dispersion medium are liquids. It may be oil-in-water or water-inoil type Emulsifiers can be sued to stabilize the emulsion. Soaps, detergents, proteins, and gums are used as emulsifiers.

Which of the following examples is/are oil-in-

water-type emulsion?

A. Ink

B. Detergent

C. Soap

D. Milk

Answer: D

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**29.** Emulsions are also called the colloidal solutions in which the disperse phase as well as dispersion medium are liquids. It may be oil-in-water or water-inoil type Emulsifiers can be sued to stabilize the emulsion. Soaps, detergents, proteins, and gums are used as emulsifiers.

Emulsion can be destroyed by (more than one correct)

A. The addition of emulsifier which tends to

form another emulsion

B. Electrophorsis with high potential

## C. Freezing

D. All

## Answer: B::C

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**30.** Emulsions are also called the colloidal solutions in which the disperse phase as well as dispersion medium are liquids. It may be oil-in-water or water-inoil type Emulsifiers can be

sued to stabilize the emulsion. Soaps, detergents, proteins, and gums are used as emulsifiers.

Butter is an emulsion of type

A. Water in oil

B. Oil in water

C. None

D. N//A

Answer: A

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**31.** Emulsions are also called the colloidal solutions in which the disperse phase as well as dispersion medium are liquids. It may be oil-in-water or water-inoil type Emulsifiers can be sued to stabilize the emulsion. Soaps, detergents, proteins, and gums are used as emulsifiers.

Addition of lyophilic solution to the emulsion forms

A. A protective film around the dispersed

phase

B. A protective film around the dispersion

medium.

- C. An aerosol
- D. True solution

Answer: A



**32.** Emulsions are also called the colloidal solutions in which the disperse phase as well as dispersion medium are liquids. It may be oil-in-water or water-inoil type Emulsifiers can be sued to stabilize the emulsion. Soaps, detergents, proteins, and gums are used as emulsifiers.

Which of the following is homogeneous

A. Milk

B. Paint

C. Shampoo

D. None of these

#### Answer: A

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**33.** There are certain substances which behave as normal, strong electrolyte at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggeregated particles. Such colloidals called associated colloids and the aggeregated particles are called micelles. The formation of micelles take place above certain concentration called critical micelization concentration called critical micellization concentration (CMC) and a characteristic temperature. Micelles are

A. Emulsion-cum-gel

B. Adsorbed catalyst

C. Associated colloids

D. Ideal solutions

### Answer: A



**34.** There are certain substances which behave as normal, strong electrolyte at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggeregated particles. Such colloidals called associated colloids and the aggeregated particles are called micelles. The formation of micelles take place above certain

concentration called critical micelization concentration called critical micellization concentration (CMC) and a characteristic temperature. Micelles are formed only A. Above CMC and above the Kraft tempareture B. Below CMC and the Kraft tempareture C. Above CMC and below the Kraft tempareture

D. Below CMC and above the Kraft

tempareture

Answer: A

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**35.** There are certain substances which behave as normal, strong electrolyte at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggeregated particles. Such colloidals called associated colloids and the aggeregated particles are called micelles. The formation of micelles take place above certain concentration called critical micelization concentration called critical micellization concentration (CMC) and a characteristic temperature.

Above CMC, the surfactant molecules undergo

(more than one correct)

A. Aggregation

**B.** Micelles formation

C. Dissociation
D. All

Answer: A::B

### Watch Video Solution

**36.** There are certain substances which behave as normal, strong electrolyte at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggeregated particles. Such colloidals called associated colloids and the aggeregated particles are called micelles. The formation of micelles take place above certain concentration called critical micelization concentration called critical micellization concentration (CMC) and a characteristic temperature.

What type of molecules form micelles?

A. Non-polar molecules

B. polar molecules

C. Surfactant molecules

D. Salt of weak acid and weak base

### Answer: C



**37.** There are certain substances which behave as normal, strong electrolyte at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggeregated particles. Such colloidals called associated colloids and the aggeregated particles are called micelles. The formation of micelles take place above certain

concentration called critical micelization concentration called critical micellization concentration (CMC) and a characteristic temperature.

Micelles are used in

A. Detergents

B. Petroleum recovery

C. Magnetic separation

D. All of these







## **Exercises Multiple Correct**

**1.** Which of the following statements is/are wrong?

A. Zeolites are hydrated aluminosilicates

which can be used as shape-selective

catalsts.

B. Enzymes show maximum activity when

pH is either very low or very high.

C. Enzymes show maximum activity at room

temperature  $(20-25^{\,\circ}C)$ 

D. Chemically, all enzymes are globular

proteins.

Answer: A::B::C

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2. Which of the following statements is/are

not correct ?

A. A catalyst always increases the speed of

a reaction.

- B. A catalyst does not take part in the reaction.
- C. A catalyst may affect the nature of the products formed.
- D. A catalyst is always an external

substance added to the reaction

mixture.

Answer: A::B::D



- **3.** Which of the following is/are coorectly matched?
  - A. Butter-gel
  - B. Milk-emulsion
  - C. Fog-aerosol
  - D. Dust-solid sol

Answer: A::B::C





**4.** Which of the following is/are elastic gel?

A. Gelatin

B. Silicic acid

C. Agar agar

D. Starch

Answer: A::C::D

5. Which of the following is/are negatively charged sol?

A. Gold sol

B. Prussian blue dye

C. Haemolobin

D. Starch

Answer: A::D

6. Which of the following is/are aerosols?

A. Smoke

B. Milk

C. Butter

D. Fog

Answer: A::D



**7.** Which of the following increase(s) the activation of a solid adsorbent?

A. Polishing the surface of the solid adsorbent.

- B. Subdividing the solid adsorbent.
- C. Blowing superheated steam through the

porous adsorbent.

D. Adsorbent at very low pressure.

### Answer: B::C





**8.** Which of the following is/are lyphobic colloids?

A. gold sol

B.  $As_2S_3$  sol

C.  $Fe(OH)_3$  sol

D. Starch sol

Answer: A::B::C

**9.** Which of the following statements is/are correct ?

A. Physical adsorption is multilayer, nondirectional, and non-specific.

B. On some cases, solvent may be adsorbed

in preference to the solute on the

surface of the adsorbent.

C. Chemical adsorption increases with

increases in temperature.

D. Due to adsorption, surface energy

increases.

Answer: A::B

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10. Which of the following is/are not correctly

matched?

A. Emulsion-curd

B. Foam-mist

C. Aerosol-smoke

D. Solid sol-cake

### Answer: A::B::D



### **11.** Which one of the following is/are correct

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: A::B::D

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# **12.** Which of the following statements is/are correct ?

A. Increases of pressure increases the

amount of adsorption.

B. Increases of temperature may decreases

the amount of adsorption

C. The adsorption may be monolayered or

multilayered.

D. Particle size of the adsorbent will not

affect the amount of adsorption.

Answer: A::B::C

**13.** Which of the following electrolytes will not be most effective in the coagulation of fold sol?

A.  $NaNO_3$ 

 $\mathsf{B}.\,K_4\big[Fe(CN)_6\big]$ 

 $\mathsf{C.}\,Na_3PO_4$ 

D.  $MgCl_2$ 

Answer: A::B::C



14. Which of the following are macromolecular

colloids?

A. Starch

B. Soap

C. Detergent

D. Cellulose

Answer: A::D

15. Isoelectric point is the pH at which

colloidal particles

A. Coagulate

B. Becomes electrically neutral.

C. Can move toward either electrodes

D. None of these

Answer: A::B::C

16. Tyndall effect is applicable when

A. The diameter of the dispersed particle is

not much smaller than the wavelength

of the light used.

- B. The diameter of the dispersed particles is much smaller than the wavelength of the light used.
- C. The refractive indices of the dispersed

phase and the dispersed phase and the

dispersion medium must be same.

D. The refractive indices of the dispersed

phase and the dispersion medium must

differ greatly in magnitude.

Answer: A::D

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17. Multimolecular colloids are present in?

A. Sol of sulphur

B. Sol of protein

C. Sol of gold

D. Soap solution

Answer: A::C

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18. Which of the following belong(s) to the

family of enzymes?

A. Lipase

**B.** Pepsin

C. Ptyalin

D. Cellulose

Answer: A::B::C

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19. Which of the following is/are not possible

in case of autocatalysis?

A. Reactant catalysis

B. Heat produced in the reaction catalysis

C. Product catalysis

D. Solvent catalysis

Answer: A::B::D

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# **20.** Which is not adsorption isobar for

chemisorption?

A. 
$$x \rightarrow x$$



### Answer: A::B::D



# **21.** Which of the following is/are the characteristic of a catalyst?

A. It changes equilibrium point				
B. It alter the rate of reaction				
C. It initiates the reaction				
D. It increases	the	average	KE	of
molecules				
Answer: B::C::D				

**22.** Which one of the followings is/are an example of homogeneous catalysis?

A. Formation of  $SO_3$  in the chamber process.

B. Formation of  $SO_3$  in the contact

process.

C. Hydrolysis of an ester in the present of acid.

presence on Manganese Dioxide

Answer: A::C::D

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23. Efficiency of the catalyst does not depend

on its?

A. Molecular weight

B. Number of free valencies

C. Physical state

D. Amount used

### Answer: A::C::D



### **24.** Which of the following is/are application(s)

of adsorption?

A. De-ionization of water

B. Gas masks

C. Hygroscopic nature of  $CaCl_2$ 

D. Heterogeneous catalysis

Answer: A::B::D

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25. Which of the following statements is/are

correct in the case of heterogenous catalyst?

A. The catalyst lowers the energy of activation.

B. The catalyst actually forms a 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: A::B::C

**1.** Example of an intrinsic colloid is

- A.  $As_2S_3$  sol
- B. S sol
- C. Egg albumin
- D.  $Fe(OH)_3$  sol

#### Answer: C



2. which of the following colloidal systems, fog

is an example?

A. Liquid dispersed in gas

B. Gas dispersed in Gas

C. Solid dispersed in gas

D. Solid dispersed in liquid

Answer: A

3. Soaking of water by a sponge is an example

of

A. Simple adsorption

B. Physical adsorption

C. Chemisorption

D. Absorption

Answer: D
4. Generally Adsorption is an endothermic process. true/false
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5. By which of the following, one mol of Silver lodide/Ag+ sol is coagulated (a)1 mol of Kl(b)500mL of  $1MK_2SO_4$ (c)300mL of  $1MNa_3PO_4$  solution

(d)1 mol of Agl

A. 1 mol of Kl

#### B. 500mL of $1MK_2SO_4$

C. 300mL of  $1MNa_3PO_4$  solution

D. 1 mol of Agl

Answer: A::D

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**6.** Arsenic (III) sulphide forms a sol with a negative charge.

Which of the following ionic substances

should be most effective in coagulating the

sol?

- A. KCl
- $\mathsf{B.}\,MgCl_2$
- $\mathsf{C.}\,Al_2(SO_4)_3$
- D.  $Na_3PO_4$

#### Answer: C



**7.** Aluminium hydroxide forms a positively charged sol.

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

- A. NaCl
- B.  $CaCl_2$
- $\mathsf{C}. \operatorname{Fe}_2(SO_4)_3$
- D.  $K_3PO_4$

Answer: D



Answer: B

**9.** The colligative property of a colloidal sol compared to the solution of non-electrolyte of same cancentration will be

A. Same

B. Higher

C. Lower

D. Higher or lower

### Answer: C

**10.** Which of the following act as a protective colloids?

A. Gelatin

B. Silica gel

C. Oil-in-water emulsion

D. All correct

Answer: A

**11.** An emulsifier is an agent which:

A. Accelerates the dispersion

- B. Homogenizes an emulsion
- C. Stabilizes an emulsion
- D. Aids the flocculation of an emulsion

Answer: B

**12.** The stabillization of the dispersed phase in

a lyopobic sol is due to

A. The adsorption of charged substances

on dispersed phase.

B. The large electro-Kinetic potential

developed in the colloid.

C. The formation of an electrical layer

between two phase.

D. The viscosity of the medium

#### Answer: C



# **13.** The diameter of collodal particle is of the order

A. 
$$10^{-3}m$$
  
B.  $10^{-6}m$ .  
C.  $10^{-15}m$ .  
D.  $10^{-7}m$ 

#### Answer: D



**14.** The process of passing of a precipitate into colloidal solution on adding an electrolyte is called

A. Dialysis

**B.** Peptization

C. Electrophoresis

D. Electro-osmosis





15. Tyndall effect is not observed in

A. Suspension

- B. True solution
- C. Emulsions
- D. Colloidal solution

Answer: B



**16.** The process of removing dissolved impuities from a colloidal system by means of diffusion through suitable membrane under the influence of an electric field os called

- A. Electro-osmosis
- B. Electrodialysis
- C. Electrophoresis
- D. Peptization

#### Answer: B



# **17.** Movement of colloidal particles under the influence of electric field is called

A. Cataphoresis

- B. Electro-osmosis
- C. Sedimentation
- D. Electrodialysis





**18.** Smoke is a dispersion of:

A. Gas in gas

B. Gas is solid

C. Solid in gas

D. Liquid in gas

Answer: C



# **19.** The colloidal sol of $As_2S_3$ prefers to adsorb

A.  $NO_3^{\,\Theta}$ 

- $\mathsf{B.}\,K^{\,\oplus}$
- $\mathsf{C.}\,S^{2\,-}$
- D.  $H^{\,\oplus}$

#### Answer: C





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

- A.  $[SnOH_2]SnO_3^{2\,-}$  ,  $2Na^{\,\oplus}$
- B.  $[SnOH_2]Sn^{4\,+}, O^{2\,-}$
- $\mathsf{C}.\,[SnOH_2]Na^{\,\oplus}\,,OH^{\,\Theta}$
- D.  $[SnO_2]Sn^{4\,+}, OH^{\,\Theta}$

#### Answer: A





21. Smoke has generally blue tinge. It is due to

A. Scattering

**B.** Coagulation

C. Brownian motion

D. Electro-osmosis

Answer: A

**22.** Adsorption is a process in which a substance accumulates on the ...... of the other substance.

A. Accumulates on the surface of other substanceB. Goes into the body of the other substance

C. Remains close to the other substnace

D. None is correct





- 23. What is sorption ?
  - A. Adsorption takes place
  - B. Adsorption takes place
  - C. Both take place
  - D. Desorption takes place

Answer: C



**24.** In the adsorption of oxalic acid by activated charcoal, the activated charcoal is known as:

A. Adsorbent

B. Adsorbate

C. Adsorber

D. Absorber

Answer: A



**25.** There is desorption of physical adsorption when

- A. Temperature is increased
- B. Temperature is decreased
- C. Pressure is increased
- D. Concentration is increased







- 26. The rate of chemisorption
- a. increaeses with decreases in temperature
- b. increases with increases in tempreture
- c. increases with decreases in the pressure of gas
- d. is independent of the pressure of gas
  - A. Decreases with increases of pressure
  - B. Increases with increases of pressure
  - C. Is independent of pressure

D. Is independent of temperature

Answer: B

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# **27.** Which of the following is not a characteristic of chemisorption?

A. It is irreversible.

B. It is specific.

C. It is multilayer phenomenon.

D. Heat of adsorption is about -400KJ .

#### Answer: C

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**28.** Chromatography is a technique based on.

(a)Adsorption and then desorption of solute

(b)Absorption of solute

(c)Hydration of solute

(d)Evaporation of solute

#### A. Adsorption and then desorption of

solute

B. Absorption of solute

C. Hydration of solute

D. Evaporation of solute

Answer: A

**29.** Oil-soluble dye is mixed with water-in-oil emulsion, then

A. Dispersion medium is coloured

B. Dispersed phase is coloured

C. Both coloured

D. None is coloured

Answer: A

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

A. O-in-W

B. W-in-O

C. O-in-O

D. W-in-W

Answer: A

**31.** Name a substance that can be used as washing powder without scum formation in hard water.



**32.** Amount of gas adsorbed per gram of adsorbent increases with pressure, but after a certain limit is reached, adsorption becomes constant. It is where

A. Multilayers are formed

- B. Desorption takes place
- C. Temperature is increased
- D. Adsorption also start

Answer: A

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**33.** Softening of hard water is done using sodium aluminium silicate (zeolite) . This causes

A. Adsorption of  $Ca^{2\,+}$  and  $Mg^{2\,+}$  ions of

hard water replacing  $Na^{\oplus}$  ions.

B. Adsorption of  $Ca^{2+}$  and  $Mg^{2+}$  ions of

hard water replacing  $Al^{3+}$  ions.

- C. Both (a) and (b) are true
- D. None is true

Answer: A



#### 34. Anionic surfactants are



 $\mathsf{C.}\,C_{18}H_{37}NH_3Cl$ 



Answer: A::B



#### 35. What are surfactants?







D. 
$$C_{16}H_{33}N(CH_3)_3Cl$$

#### Answer: C::D



36. What are surfactants?

**A.** a. R--SO<sub>3</sub>Na

## $\mathsf{B.}\,C_{17}H_{35}COONa$

## $\mathsf{C.}\, C_n H_{2n+1} (OCH_2 CH_2)_x OH$

D. All

Answer: C

37. Micelles are

A. Ideal solution

B. Associated colloids

C. Adsorbed surface

D. Absorbent solutions

Answer: B

**38.** Compared to common colloidal sols milcells have:

A. Higher colligative properties

B. Lower colligative properties

C. Same colligative properties

D. None is ture

Answer: B
**39.** Which one of the following statements is not correct?

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

B. Sols of metal sulphides are lyophilic.

C. Hardy Schulze law states, the bigger the

size of the ions, the greater is its coagulating power.

D. One would expect charcoal to adsorb

chlorine more strongly than hydrogen

sulphide.

Answer: A

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40. Catalyst increases the rate by

A. Decreasesing  $E_a$ 

B. Increasing  $E_a$ 

C. Decreasing entropy

D. Increasing entropy

### Answer: A::C

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## **41.** the catalyst used in the hydrogenation of

oils is :

A. Fe

 $\mathsf{B}.Ni$ 

**C**. *Pt* 

 $\mathsf{D}.\,Mo$ 

Answer: B



42. Which of the following is present at the

time of cracking of hydrocarbons?

A. Copper

B. Zeolite

C. Nickel

D. Molybdenum

#### Answer: A



# **43.** Which is not the correct statement for a catalyst?

A. It does not alter  $E_a$  .

B. The surface of a catalyst adsorbs

reactant

C. Catalyst may form intermediates with

reactants.

D. Action of enzyme catalyst is always

specific.

Answer: C

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44. Catalyst used in polymerization of ethen is:

A.  $TiCl_4$  and  $AIR_3$ 

 $\mathsf{B.}\,Fe,\,Co$ 

 $\mathsf{C}.\,H_3PO_4$ 

D. `Zeolites

Answer: A



**45.** Gold number of a lyophic sol is such a property that

A. The larger its value, the greater is the peptizing power.

B. The lower its value, the greater is the

peptizing power.

C. The lower its value, the greater is the

peptizing power.

D. The larger its value, the greater is the

protecting power.

Answer: C

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**46.** Energy of activation of forward and backward reaction are equal in case (numerical calues) where

A.  $\Delta H=0$ 

B. No catalyst present

 $\mathsf{C.}\,\Delta S=0$ 

D. Stoichiometry is the mechanism

Answer: A

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# **47.** Which one of the following is a nature colloid?

A. Sodium chloide solution

- B. Cane sugar solution
- C. Urea solution
- D. Blood

### Answer: D

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**48.** Collidal solutios of gold prepared by different methods are of different colours because of

A. Different	diameters	of col	loidal	gold
particles				
B. Variable valency of gold				
C. Different	concentr	ations	of	gold
particles				
D. Impurites	produce	d by	dif	ferent
methods				
Answer: A				
<b>Watch Video Solution</b>				

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

A. The blood starts flowing in opposite direction.

B. The blood reacts and forms a solid,

which seals the blood vessel.

C. The blood is coagulated and thus the

blood vessel is sealed.

D. The ferric chloride scals the blood vessel.





## **50.** If liquid is dispersed in solid medium, then this is called as:

A. Sol

- **B. Emulsion**
- C. Liquid aerosol
- D. Gel

#### Answer: D



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

A. 
$$\log \frac{X}{m} = \log P + \frac{1}{n} \log K$$
  
B.  $\log \frac{X}{m} = \log K + \frac{1}{n} \log P$   
C.  $\frac{X}{m} \propto P^n$ 

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

Answer: B





forces.

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Single Correct Answer Type

**1.** Which of the following is/are true statements

A. Water vapour is absorbed by anhydrous calcium chloride both adsorbed by silica gel.

B.  $NH_3$  is absorbed by water but adsorbed by charcoal.

C. Sugar is decolourized by animal charcoal

based on adsorption.

D. Water is absorbed by conc  $H_2SO_4$  .



**Exercises Assertion Reasoning** 

1. Assertion(A):  $Fe^{3+}$  can be used for coagulation of  $As_2S_3$  sol. Reason (R):  $Fe^{3+}$  reacts with  $As_2S_3$  to give  $Fe_2S_{3.}$ 

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct.

### Answer: C



**2.** Assertion : Aqueous gold colloidal sol is red in colour.

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

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

Answer: A

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**3.** Assertion(A): Physical adsorption of milecules on the surface requires activation energy.

Reason(R): Because the bonds of adsorbed molecules are broken.

(a)If both (A) and (R) are correct, and (R) is the

correct explanation of (A)

(b)If both (A) and (R) are correct, but (R) is the

correct explanation of (A).

(c)If (A) is correct, but (R) is incorrect.

(d)If (A) is incorrect, but (R) is correct. S

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

#### **Answer:**

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4. Assertion(A): Langmuir adsorption is a

single-layer phenomenon.

Reason(R): It is due to van der Waals forces.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct.

Answer: C

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5. Assertion(A): Small quanity of soap is used

to prepare a stable emulsion.

Reason(R): Soap lowers the interfacial tension

between oil and water.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

### Answer: A



**6.** 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. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

Answer: A

Watch Video Solution

**7.** Assertion(A): Alcohols are dehydrated to hydrocarbons in the pressure of acidie

zeolites.

Reason(R): Zeolites are porous catalysts.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

#### Answer: C

Watch Video Solution

**8.** Assertion(A): Activity of an enzyme is pH dependent.

Reason(R): Change in pH affects the solution of the enzyme in water.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

not the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct.

#### Answer: C

Watch Video Solution

9. Assertion: A reaction cannot become fast by itself unless a catalyst is added.
Reason: A catalyst always increases the speed of a reaction.

(a)If both (A) and (R) are correct, and (R) is the

correct explanation of (A)

(b)If both (A) and (R) are correct, but (R) is the

correct explanation of (A).

(c)If (A) is correct, but (R) is incorrect.

(d)If (A) is incorrect, but (R) is correct.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

#### Answer:



10. Assertion(A): A catalyst speed up a reaction
but does not participate in its mechanism.
Reason(R): A catalyst provides an alternative
path of lower activation energy to the
reactants.

A. If both (A) and (R) are correct, and (R) is the correct explanation of (A) B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

#### Answer:

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**11.** Assertion(A): Fruit formation process shows

increase in the rate with passage of time.

Reason(R): Hydrolysis of these ester is

homogeneous autocatalytic reaction.

(a) If both (A) and (R) are correct, and (R) is the

correct explanation of (A)

(b)If both (A) and (R) are correct, but (R) is the

correct explanation of (A).

(c)If (A) is correct, but (R) is incorrect.

(d)If (A) is incorrect, but (R) is correct.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

Answer: A

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12. Assertion(A): Catalysts are aways transition

metals.

Reason(R): Trasition metals have varitable oxidation state.

A. If both (A) and (R) are correct, and (R) is

not the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

Answer: B

Watch Video Solution
13. Assertion(A): The mass of nickle catalyst recovered after being used in the hydroenation of an oil is less than the mass of nickle added to the reaction.
Reason(R): Catalyst take part in the reaction but the are recoveres in the end.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

Answer: D

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14. STATEMENT-1 : Enzymes are protein but

protein are not enzymes

and

STATEMENT-2 Enzymes are bio-catalyst and

posses a stable configuration having a active site poket.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

## Answer: D

**15.** Assertion(A): The pressence of a catalyst increases the speed of the forward and backward reactions to the same extent. Reason(R): Activation energy for both the forward and backward reactions is lowered to same extent.

A. If both (A) and (R) are correct, and (R) is the correct explanation of (A) B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

Answer: A

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**16.** Assertion (A): Hydrolyiss of ethyl acetate in the presence of acid is a reaction of first order whereas in the presence of alkali, it is a reaction of second order.

Reason (R): Acid acts as catalyst only whereas

alkali act as one of the reactant.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

### Answer: A



17. Assertion(A): In chemisorption, adsorptionkeeps on increasing with temperature.Reason(R): Heat keeps on providing more andmore activation energy.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A)

B. If both (A) and (R) are correct, but (R) is

the correct explanation of (A).

C. If (A) is correct, but (R) is incorrect.

D. If (A) is incorrect, but (R) is correct. S

### **Answer:**



**Exercises Interger** 

1. From the given following sol how many can

coagulate the haemoglobin sol?

 $Fe(OH)_3, Ca(OH)_2, Al(OH)_3, \,\, {
m starch, \, clay,}$ 

 $As_2S_3, CdS,$ basic dye.

A. 1

B. 3

C. 4

D. 8

Answer: C



2. 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.

A. 4

B. 3

C. 2

D. 8

Answer: A





**3.** For the coagulation of 500mL of arsenious sulphide sol, 2mL of 1MNaCl is required. What is the flocculation value of NaCl?

A. 3

B. 2

C. 5

D. 4

### Answer: D



**4.** The coagulation of 100mL of a colloidal solution of gold is completely prevented by the addition of 0.030g of it before adding 1mL of 10% NaCl solution. Find out the gold number of starch?

A. 4

B. 8

C. 3

## Answer: A



5. The gold number of gelatin is 0.01 . Calculate the amount of gelatin to be added to 1000mL of a colloidal sol of gold to prevent its coagulation, before adding 1mL of 10% NaCl solution.

A. 2

C. 4

D. 5

### Answer: B



# **6.** 526.3mL of 0.5mHCl is shaken with 0.5g of activated charcoal and filtered. The concentration of the filtrate is reduced to 04m. The amount of adsorption (x/m) is

A. 3

B. 6

C. 8

D. 4

Answer: D

# Watch Video Solution

7. In an experiment, addition of 5.0mL, of  $0.006MBaCl_2$  to 10.0mL of arsenic sulphite sol just causes the complete coagulation in

## 34h . The flocculating value of the effective ion

is:

A. 2

B. 3

C. 4

D. 5

Answer: A



8. 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.

A. 4

B. 2

C. 6

D. 8





# Exercises Fill In The Blanks

## 1. Adsorption is the phenomenon in which

substance

**2.** In adsorption, the substance which acculates on the surface of the other substance is termed as.....



**3.** Physical adsorption is appeciable

at.....temperature,



- 5. Chromatography is a technique based
- on..... Adsorption of defferent

constituents of mixture.

**6.** Which of the following is true during adsorption?

a.  $\Delta G$  ,  $\Delta H$  , and  $\Delta S$  all are negative.

b.  $\Delta G$  is negative, but  $\Delta H$  and  $\Delta S$  is positive.

c.  $\Delta G$  and  $\Delta H$  are negative, but  $\Delta S$  is positive.

d.  $\Delta G$  and  $\Delta S$  are negative, but  $\Delta H$  is positive.

**7.** A cusrve showing the variation of extent of adsorption with temperature at constant pressure is called.....



8. Chemisorption forms ...... Molecular

layers .



9. Fill in the blanks by choosing the appropriate word/words from those given in the brackets.(dialysis, peptization , dispersed phase, dispersion medium, electrophoresis, product, electro-osmosis , coagulation , coagulates, emulsion, gel, gold number, Tyndall effect , protective colloids electrodialysis) In autocatalysis, one of the..... of the reaction

acts as a catalyst.



10. A catalyst promoter..... The efficiency of a

catalyst while a poison..... The efficiency of

the catalyst.



**11.** Fill in the blanks by choosing the appropriate word/words from those given in the brackets.(dialysis, active, dispersed phase, dispersion medium , free , electro-osmosis , coagulation , coagulates, emulsion , gel , gold

number, Tyndall effect, protective colloids,

electrodialysis)

Rough surfaces have more......centres on

account of ...... unsatisfied valencies.



**12.** Fill in the blanks by choosing the appropriate word/words from those given in the brackets.(dialysis, peptization , dispersed phase , dispersion medium , electrophoresis , heterogeneous, coagulation , coagulates,

emulsion, gel, homogeneous, Tyndall effect,

protective colloids , electrodialysis)

Intermediate compound formation theory

explains ...... catalysis.



**13.** Fill in the blanks by choosing the appropriate word/words from those given in the brackets.(dialysis, peptization , dispersed phase , dispersion medium , electrophoresis , electro-osmosis , adsorption , coagulates,

Watch Video Solution

**14.** Enzymes are highely.....in action.

**Watch Video Solution** 

**15.** Chemical equilibrium is..... by a catalyst.



18. Colloids represent a state of .....and

not a class of substances.

Watch Video Solution

19. Colloids consist of ......phase, viz, .....and

Watch Video Solution

.....



**21.** Blood is a ..... charged sol.



22. The sky looks blue due to ..... effect.



24. According to Hardy Schulze rule, the power

of coagulation of an ion depends upon.....

25. The emulsoid which is added to suspensoid

to prevent flocculation is called.....



**26.** The ability of the protective colloid is measured in terms of.....

**27.** The process of removing dissolved substance from a colloidal solution by means of diffusion through a suitable membrane is termed as.....

**Watch Video Solution** 

28. The dispersion medium in aerosol is.....

29. The phenomenon of scattering of light by

colloidal particle is called.....

Watch Video Solution

**30.** Bleeding is stopped by the application of

ferric chloride. This is due to ...... Of blood.

Watch Video Solution

**31.** Gold number is minimum in case of.....





**34.** A metal is in the form of dispersed phase and water is the dispersion medium. The colloid is termed as.....

Watch Video Solution

# 35. The zig-zag motion of colloidal particle is

called.....
## 36. The liquid-liquid colloidal dispersions are

called.....

Watch Video Solution

**37.** The ratio of enthalpy of chemisorption to

enthalpy of

physisorption is

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**Exercises True False** 

1. Peptization is reverse of coagulation. T or F



**2.** Milk is an emulsion of W/O type.True or

False

**Watch Video Solution** 

**3.** Fog is a colloid of solid in gas. True/False?





5. Collidal solution is a heterogeneous solution which contains particle of intermediate size, i.e., (diameter between 1 and 1000 nm) colloidal is not a substance but it is a state of a substance which depends upon the molecular size. Colloidal solutions are intermediate between true solution and suspensions.

The colloidal particle can pass through

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6. Colloidal solution of a liquid dispersed in

solid is called gel. True/False



8. The charge on the colloidal particle is due to

preferential adsorption of inos. True/False

9. The charge on the colloidal particles does not account for the stability sols.T or F Watch Video Solution **10.** Metal sol is negatively charged. True/False Watch Video Solution

11. Adsorption is exothermic. True/False

**12.** STATEMENT-1 : Enzymes are protein but protein are not enzymes

and

STATEMENT-2 Enzymes are bio-catalyst and posses a stable configuration having a active site poket.

13. Promoters are substances which increases

the efficiency of catalyst.T or F

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14. Actication energy is always lowered by

positive catalyst. T or F

**15.** In physical adsorption, the molecules of adsorbate are held by chemical forces. True or False

i aise



**16.** In physical adsorption, the molecules of adsorbate are held by chemical forces. True or

False



**17.** Combination of  $N_2$  and  $H_2$  in the presence of Fe as a catalyst is an example of heterogeneous catalysis.

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**18.** Acetic acid formed during hydrolysis of ester acts as an induced catalyst. True/False

19. The activity of enzyme is increased in the

presence of certain substances known as co-

enzymes or acticators. T or F



## 20. A catalyst remains unchanged chemically

at the end of the reaction. True/False



**Archives Multiple Correct** 

**1.** The correct statement(s) pertaining to the adsorption of a gas on a solid surface is(are) (i) adsorption is always exothermic (ii) physisorption may transform into chemsisorption transform into chemisorption at high temperature (iii) physisorption increases with increasing temperature but chemisorption decreases with increasing temperature.

(iv) chemisorption is more exothermic than

physisorption , however it is very slow due to

higher energy of activation.

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

A. Preferntial adsorption of ions on their

surface from the solution.

B. Preferntial adsorption of solvent on their surface from the solution. C. Attraction between difference particle 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

**3.** The given graphs//data *I*, *II*, *II* and *IV* pepresent general terends obseved of diffent physiorpton and chemisorption processes under mild conditions of temperature and pressure , which of the following choice (s)

about I, II, II an IV is (are) correcty ?















# **Archives Single Correct**

1. The rate of physisorption increases with

(a)Decrease in temperature

(b)Increase in temperature

(c)Both A and B

(d)None of these

- A. Decrease in temperature
- B. Increase in temperature
- C. Both A and B
- D. None of these

Answer: A

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2. Lyophilic sols are

(a)Irreversible sols

(b)Prepared from inorganic compounds

(c)Coagulated by adding electrolytes

(d)Self-stabilizing

A. Irreversible sols

B. Prepared from inorganic compounds

C. Coagulated by adding electrolytes

D. Self-stabilizing

Answer: D

3. Among the following, which surfactant will form micelles in aqueous solution at the lowest molar concentration at ambient conditions? (a) $CH_{3}(CH_{2})_{15}N^{\oplus}(CH_{3})_{3}Br^{\Theta}$ (b) $CH_3(CH_2)_{11}OSO_3^{\Theta}Na^{\oplus}$ (c) $CH_3(CH_2)_6COO^{\Theta}Na^{\oplus}$ (d) $CH_{3}(CH_{12})_{11}N^{\oplus}(CH_{3})_{3}Br^{\Theta}$ 

A.  $CH_3(CH_2)_{15}N^{\oplus}(CH_3)_3Br^{\Theta}$ 

B.  $CH_3(CH_2)_{11}OSO_3^{\Theta}Na^{\oplus}$ 

C.  $CH_3(CH_2)_6COO^{\Theta}Na^{\oplus}$ 

D.  $CH_{3}(CH_{12})_{11}N^{\oplus}(CH_{3})_{3}Br^{\Theta}$ 

#### Answer: A

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**4.** Among the following electrolytes, which is the most effective coagulation agent for  $Sb_2S_3$  solution? (a) $Na_2SO_4$ 

(b) $CaCl_2$ 

 $(c)Al_2(SO_4)_3$ 

(d) $NH_4Cl$ 

A.  $Na_2SO_4$ 

B.  $CaCl_2$ 

 $\mathsf{C.}\,Al_2(SO_4)_3$ 

 $\mathsf{D.}\, NH_4Cl$ 

Answer: C

5. The coagulating power of electrolytes having inos  $Na^{\oplus}$ ,  $Al^{3+}$  and  $Ba^{2+}$  for arsenic sulphide sol increases in the order (a) $Na^{\oplus} < Ba^{2+} < Al^{3+}$ (b) $Ba^{2+} < Na^{\oplus} < Al^{3+}$ (c) $Al^{3+}$  <  $Na^{\oplus}$  <  $Ba^{2+}$ (d) $Al^{3+} < Ba^{2+} < Na^{\oplus}$ A.  $Na^{\oplus} < Ba^{2+} < Al^{3+}$  $\mathsf{B}.\,Ba^{2\,+}\,< Na^{\,\oplus}\,< Al^{3\,+}$  $\mathsf{C}.\,Al^{3\,+}\,<\,Na^{\,\oplus}\,<\,Ba^{2\,+}$ 

D. 
$$Al^{3+} < Ba^{2+} < Na^{\oplus}$$

Answer: A

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6. Methylene blue, from its aqueous solution, is adsorbed on activated charcoal at  $25^{\circ}C$ . Identify correct one (a)The adsorption requires activation at  $25^{\circ}C$ (b)The adsorption is accompanied by a decrease in enthalpy (c)The adsorption increases with increases of

temperature

(d)The adsorption is irreversible

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

B. The adsorption is accomanied by a

decrease in enthalpy

C. The adsorption increases with increases

of temperature

D. The adsorption is irreversible





## Archives Assertion Reasoning

**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)If both (A) and (R) are correct, and (R) is the

correct explanation of (A).

(b)If both (A) and (R) are correct, but (R) is not

the correct explanation of (A).

(c)If (A) is incorrect, but (R) is correct.

(d)If both (A) and (R) are incorrect.

A. If both (A) and (R) are correct, and (R) is

the correct explanation of (A).

B. If both (A) and (R) are correct, but (R) is

not the correct explanation of (A).

C. If (A) is incorrect, but (R) is correct.

D. If both (A) and (R) are incorrect.

Answer: B

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Archives Fill In The Blanks

1. The adsorption of a gas by palladium is

commonly known as .....

**1.** Twenty precent of the surface sites of a catalyst is occupied by nitrogen molecules. The density of surface sites is  $6.023 imes 10^{14} cm^{-2}$  . The total sarface area is  $1000 cm^2$  . The catalyst is is henced to 300 Kand nitrogen is completely desorbed a pressure of 0.001 atm and volume of  $2.46 cm^3$  . Calculate the number of sites occupied by niitrogen molecules.



2. 1g charcoal is placed in 100mL of  $0.5MCH_3COOH$  to form an adsorbed monolayer of acetic acid molecule and thereby the molarity of  $CH_3COOH$  reduces to 0.49. Calculate the surface area of charcoal adsorbed by each molecule of acetic acid. Surface are of charcoal  $= 3.01 \times 10^2 m^2/g$ .