

SURFACE CHEMISTRY

Adsorption physisorption and chemisorptions: factors affecting adsorption of gases on solids

LEVEL - I

Introduction - Adsorption

1. Adsorption is the phenomenon in which a substance

1. Accumulates on the surface of other substance.
2. Goes into the body of the other substances
3. Remains close to the other substances
4. Oxidizes or reduces the other substances.

2. Adsorption is always

1. Endothermic
2. Exothermic
3. Accompanies with increase in entropy
4. Accompanies with increase of enthalpy

3. Which of the following is not considered as absorption?

- 1) Chalk piece dipped in ink
- 2) Sponge placed in water
- 3) Finely divided charcoal stirred in water dilute acetic acid
- 4) All the above

4. Sorption is

- 1) Bulk phenomenon
- 2) surface phenomenon
- 3) Both
- 4) dispersion

5. Occlusion of gases by metals involves

1. Adsorption
2. Absorption
3. Sorption
4. Desorption

6. Which of the following substances act as adsorbent

- 1) Silica gel
- 2) Metals
- 3) Colloids
- 4) All of these

7. **The coloring matter removed by animal charcoal during purification of sugar acts as**
1. Adsorbate
 2. Adsorbent
 3. Absorber
 4. Catalyst
8. **Surface layer of solid means**
- 1) Atoms present in the upper layer of this solid.
 - 2) atoms present up to a depth of 100nm on the surface.
 - 3) atoms present in the bulk of the solid.
 - 4) atoms of surface of solid not preoccupied by other substances.
9. **In a chemical reaction the solid catalyst function as**
- 1) Adsorbent
 - 2) Adsorbate
 - 3) Makes the reaction mixture homogeneous.
 - 4) Micelle
10. **Separation of inert gases involves the process of**
- 1) Absorption
 - 2) Adsorption
 - 3) Desorption
 - 4) Chemisorption
11. **Activated charcoal is used in separating noble gases in Dewar's method. In this process activated charcoal acts as**
1. Absorber
 2. Adsorbent
 3. Adsorbate
 4. Catalyst
12. **The forces operating between the adsorbate and the adsorbent in physical adsorption are**
1. Vander Waals forces
 2. Chemical forces
 3. Covalent forces
 4. All the three
13. **Physical adsorption is**
1. Reversible
 2. Decreases with increase in temperature
 3. Multi layer
 4. All of these
14. **Physical adsorption is useful in**
- 1) Producing colorless material
 - 2) Producing low pressure
 - 3) Producing high vacuum
 - 4) All
15. **Physical adsorption is appreciable at**
1. High temperature
 2. Low temperature
 3. At room temperature
 4. 100⁰ C

16. Which statement is correct?

- 1) Physical adsorption is multi-layer nondirectional and non-specific
- 2) Chemical adsorption is unilayer
- 3) Chemical adsorption is more stronger than physical adsorption.
- 4) All the above

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

- 1) It is irreversible
- 2) It is specific
- 3) It is multi layer phenomenon
- 4) heat of adsorption is about 400 KJ

18. Heat evolved during chemisorption lies in the range of

- 1) 4-20 kJ/mole
- 2) 40-400 KJ/mole
- 3) 20-40 KJ/mole
- 4) 500-1000KJ/mole

19. Which of the following is not a correct statement?

1. Physical adsorption is reversible in the nature
2. Physical adsorption involves Vander Waal's forces.
3. Rate of Physical adsorption increases with increase of pressure of the adsorbate.
4. High activation energy is involved in the physical adsorption

20. Valence forces cause

- 1) Chemisorptions
- 2) physical adsorption
- 3) Sorption
- 4) adsorption involving multi layer

21. Which of the following is not a characteristic of chemisorptions?

1. Adsorption is irreversible
2. is of the order of 400 K.J
3. Adsorption is specific
4. Multilayered

22. In a spontaneous adsorption process

1. is sufficiently negative
2. is positive
3. is zero
4. all the above

23. The rate of chemisorptions

1. decrease with increase of pressure
2. is independent of pressure
3. is maximum at one atmospheric pressure
4. increase with decrease of temperature

24. Chemisorptions involves

1. Multi layered
2. Uni layered
3. Zero layered
4. Bi layered

25. Which is more selective?

- 1) Physical adsorption
- 2) Sorption
- 3) Van der Waal's adsorption
- 4) Chemisorptions

Factors Influence Adsorption

26. The extent of adsorption of a gas on a solid depends on

1. Nature of gas
2. Pressure of gas
3. Temperature
4. All the above

27. Conditions favorable for high adsorption are

1. low pressure and high temperature
2. High pressure and low temperature
3. Large surface area
4. Both 2 and 3.

28. The extent of adsorption from solution increases with

1. increasing the temperature
2. increasing the surface area of the adsorbent
3. decreasing the surface area of the adsorbent
4. decreasing the concentration of the solute

29. The extent of adsorption from solutions decreases with

1. decrease of temperature
2. increase of surface area
3. increase of temperature
4. increasing the concentration of the solute

30. Which one of the following is the correct statement?

1. Chemi-sorption is reversible in nature
2. Chemi-sorption is high at low temperature
3. Chemi-sorption depends on the nature of gas
4. Chemi-sorption does not depend upon the nature of the gas

31. Chemical adsorption

1. decreases with increase of temperature
2. increase with increase of temperature
3. first increases and then decreases with increase of temperature
4. first decreases and then increases with increase of temperature

32. Extent of adsorption during chemisorption depends upon

1. Adsorbate
2. Adsorbent
3. Both adsorbate and adsorbent
4. Neither adsorbate nor adsorbent

33. During the adsorption of acetic acid on porous charcoal from acetic acid aqueous solution, its concentration

1. increases
2. decreases
3. remains the same
4. First increases and then decreases

34. The nature of forces operating between the adsorbate and the adsorbent in the adsorption occurring at high temperature is

1. Vander Waals forces
2. Chemical forces
3. Gravitational forces
4. Fermi forces

35. Chemisorption of gas on solid does not depend on

- 1) Pressure of gas.
- 2) Temperature
- 3) Nature of adsorbate
- 4) Nature of adsorbent

Adsorption- Isotherms

36. According to Freundlich adsorption isotherm, at high pressure, the value of $\frac{x}{m}$ is

1. Directly proportional to pressure
2. Inversely proportional to pressure
3. Directly proportional to square of pressure
4. Independent of pressure

37. The mathematical equation relating x, m and p that represents Freundlich isotherm.

- 1) $\frac{x}{m} = \frac{k}{p}$
- 2) $\frac{x}{m} = KP^{\frac{1}{n}}$
- 3) $\frac{m}{x} = \frac{k}{p}$
- 4) $\frac{x}{m} = \log p^n$

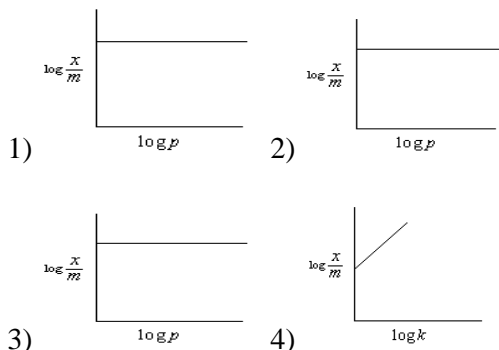
38. Freundlich adsorption isotherm in the logarithmic form is

1. $\frac{1}{n} \log P = \log \left(\frac{x}{m} \right) + \log K$
2. $\log K = \log P + \frac{1}{n} \log \left(\frac{x}{m} \right)$
3. $\log \left(\frac{x}{m} \right) = \frac{1}{n} \log K + \log P$
4. $\log \left(\frac{x}{m} \right) = \frac{1}{n} \log P + \log K$

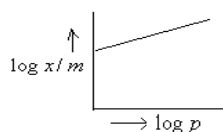
39. The plot of $\frac{x}{m}$ Vs temperature at constant pressure is called

1. Adsorption isotherm
2. Adsorption isobar
3. Adsorption isochore
4. Freundlich isotherm

40. Which one of the following represents Freundlich adsorption isotherm?



41. Freundlich adsorption isotherm is given by the expression $\frac{x}{m} = KP^{1/n}$. Then the slope of the



line in the following plot is

- 1) \sqrt{n}
- 2) $\frac{1}{n}$
- 3) X/m
- 4) P

42. The equation for Langmuir adsorption isotherm under high pressure is

- 1) $\frac{x}{m} = \frac{a}{b}$
- 2) $\frac{x}{m} = aP$
- 3) $\frac{x}{m} = \frac{1}{aP}$
- 4) $\frac{x}{m} = \frac{b}{a}$

43. In Langmuir's Adsorption of a gas on solid surface

- 1) The rate of desorption of adsorbed molecules from the surface does not depend on the surface covered
- 2) The adsorption at a single site on the surface may involve multiple molecules at the same time
- 3) The mass of gas striking a given area of surface is proportional to the pressure of the gas.
- 4) The mass of gas striking a given area of surface is independent of the pressure of the gas.

44. Which of the following is less than zero during adsorption?

- 1) ΔG
- 2) ΔS
- 3) ΔH
- 4) All of these

45. If 4g of nitrogen is allowed to adsorb at 300K and 0.8atm on 2g of solid surface. Calculate the amount of N_2 Adsorbed per gram of solid
- 1) 1 2) 2 3) 3 4) 4
- 46 Adsorption explains all the following except
1. Origin of charge on colloids 2. Decolourization of sugar solution on charcoal
3. Efficiency of finely divided metals as catalyst 4. Action of enzymes
- 47 A poisonous gas is adsorbed on activated charcoal. The activated charcoal is
1. Absorber 2. Adsorb ate
3. Adsorbent 4. Absorb ate
- 48 Which of the following is not based on adsorption?
1. Catalysis 2. Chromatography
3. Photography 4. Decolourisation of sugar
- 49 When adsorption of Oxalic acid is carried out on activated charcoal, the activated charcoal is known as
1. adsorbate 2. adsorbent
3. absorbate 4. absorbent
- 50 In washing process the surface active detergents function as
- 1) Adsorbate 2) Desorber
3) Adsorbent 4) Deactivator
51. Which is used to remove colour from raw cane sugar juice
- 1) Alumina 2) Silicajel
3) Activated charcoal 4) Nickel powder
52. When ammonia gas is enclosed in the presence of powdered charcoal in a closed vessel, the pressure of the gas decreases. It is due to
1. Absorption 2. Adsorption
3. decomposition of 4. Catalytic action of charcoal
53. Chromatographic analysis finds a number of applications in analytical and Industrial fields, based on the principle of _____
- 1) Chemical adsorption
2) Physical adsorption
3) Hydrogen bonding
4) Sedimentation

54. When water vapour is passed through silica gel, water vapour is

1. absorbed
2. adsorbed
3. cooled
4. decomposed

55. Adsorption plays an important role in

1. Heterogeneous catalysis
2. Homogeneous catalysis
3. Positive catalysis
4. Negative catalysis

56. **ASSERTION (A): Adsorption is a surface phenomenon**

REASON (R): Adsorption is an endothermic process

- 1) A and R are correct and R is the correct explanation of A
- 2) A and R are correct and R is not the correct explanation of A
- 3) A is true and R is false
- 4) A is false and R is true

57. Which one of the following statements is not applicable to chemisorption

- 1) it is highly specific
- 2) it is practically independent of pressure.
- 3) it is irreversible
- 4) it is independent of temperature

58. Which of the following is chemisorption

1. Adsorption of H_2 on Ni at high temperature
2. Adsorption of H_2 on charcoal
3. Adsorption of moisture on silica gel
4. Hydration of anhydrous $CaCl_2$

59. **ASSERTION (A): Chemical adsorption is unilayered where as physical adsorption is multilayered.**

REASON (R): In chemical adsorption strong chemical bonds are forming between adsorbent and adsorbate where as it is not possible in physical adsorption.

- 1) A and R are correct and R is the correct explanation of A
- 2) A and R are correct and R is not the correct explanation of A
- 3) A is true and R is false
- 4) A is false and R is true

60 ASSERTION (A): Physical adsorption is reversible while chemical adsorption is irreversible

REASON (R): Physical adsorption is multilayered while chemical adsorption is unilayered one.

The correct answer is

- 1) A and R are correct and R is the correct explanation of A
- 2) A and R are correct and R is not the correct explanation of A
- 3) A is true and R is false
- 4) A is false and R is true

61. Which of the following can absorb large volume of hydrogen gas?

1. Pd
2. Ni
3. $Fe(OH)_3$
4. Pt

62 The temperature above which a gas can not be liquefied even on application of high pressure is called as

- 1) Boiling point
- 2) freezing point
- 3) Critical temperature
- 4) Boyle's temperature

63 The higher the critical temperature of the gas

- 1) Greater is its adsorption
- 2) Lower its adsorption
- 3) Lesser is the case of liquification
- 4) Lesser is its volatile nature.

64. Which gas can be adsorbed more?

- 1) Gas with high critical temperature
- 2) Gas which can be liquefied easily
- 3) Gas with low critical temperature
- 4) Both 1 and 2

65 Which of the following gases is adsorbed easily and more on activated charcoal

1. CH_4
2. CO_2
3. SO_2
4. H_2

66 The gas which gets easily and extensively adsorbed at low temperature

1. H_2
2. CO_2
3. N_2
4. O_2

67 The least readily adsorbed gas among the following is

1. NH_3
2. SO_2
3. HCl
4. N_2

68 The correct order of extent of adsorption on 1 gm of an activated charcoal is

1. $H_2 > SO_2 > CH_4$
2. $CH_4 > SO_2 > H_2$
3. $SO_2 > CH_4 > H_2$
- 4.

69 Activated charcoal is prepared by

- 1) heating charcoal at 573 K to 1273 K in vacuum or in the presence of inert gas
- 2) Irradiating the charcoal with neutrons and make it radio active
- 3) Washing the charcoal with water
- 4) All are correct

KEY --- LEVEL-I

- | | | | | |
|-------|-------|-------|-------|-------|
| 1) 1 | 2) 2 | 3) 4 | 4) 3 | 5) 3 |
| 6) 4 | 7) 2 | 8) 2 | 9) 1 | 10) 2 |
| 11) 2 | 12) 1 | 13) 4 | 14) 4 | 15) 2 |
| 16) 4 | 17) 3 | 18) 2 | 19) 4 | 20) 1 |
| 21) 4 | 22) 1 | 23) 2 | 24) 2 | 25) 4 |
| 26) 4 | 27) 4 | 28) 2 | 29) 3 | 30) 3 |
| 31) 3 | 32) 3 | 33) 2 | 34) 2 | 35) 1 |
| 36) 1 | 37) 2 | 38) 4 | 39) 2 | 40) 3 |
| 41) 2 | 42) 1 | 43) 3 | 44) 4 | 45) 2 |
| 46) 4 | 47) 3 | 48) 3 | 49) 2 | 50) 3 |
| 51) 3 | 52) 2 | 53) 2 | 54) 2 | 55) 1 |
| 56) 3 | 57) 4 | 58) 1 | 59) 1 | 60) 1 |
| 61) 1 | 62) 3 | 63) 1 | 64) 4 | 65) 3 |
| 66) 2 | 67) 4 | 68) 3 | 69) 1 | |

**CATALYSIS HOMOGENOUS AND HETEROGENEOUS ACTIVITY AND SELECTIVITY,
ENZYME CATALYSIS**

- 1. A catalyst is a substance which**
 1. Increases the energy of activation
 2. Decreases the energy of activation
 3. Does not change the energy of activation
 4. Energy of activation first increases and then decreases
- 2. When a catalyst is used in a reaction, then**
 1. Nature of products changes
 2. Product yield increases
 3. Product yield decreases
 4. Time required for reaction decreases
- 3. Which is not a characteristic of a catalyst?**
 1. it changes the equilibrium
 2. It alters the reaction path
 3. It increases the rate of reaction
 4. it increases the average kinetic energy of the molecules
- 4. According to adsorption theory of catalysis the speed of the reaction increases because**
 - 1) The concentration of reactant molecules at the active centre of the catalyst becomes high due to adsorption
 - 2) In the process of adsorption the activation energy of the molecules becomes large
 - 3) Adsorption produces heat which increases the speed of the reaction
 - 4) Adsorption lowers the reaction temperature
- 5. The efficiency of the catalyst depends upon**
 1. Molecular weight 2. Physical state
 3. Number of free valencies 4. Amount used
- 6. The temperature at which the catalytic activity of the catalyst is maximum is called**
 1. Critical temperature 2. Room temperature
 3. Optimum temperature
 4. Absolute temperature

7. Which of the following catalyst is sensitive to temperature changes?
1. Fe 2. Pt 3. Ni 4. Enzyme
8. Which of the following statement is wrong among the following?
1. Haber's process of NH_3 requires iron as catalyst
2. Friedel-Craft's reaction uses anhydrous $AlCl_3$
3. Hydrogenation of oils uses iron as catalyst
4. Oxidation of SO_2 to SO_3 requires V_2O_5
9. The formation of diethyl ether from ethanol is catalyzed by
1. H_2SO_4 , $170^\circ C$ 2. Al_2O_3 , $250^\circ C$
3. H_2SO_4 , $40^\circ C$ 4. Al_2O_3 , $80^\circ C$
10. When sucrose is hydrolyzed with invertase enzyme the products are
1. Glucose 2. Fructose 3. Both 4. Maltose
11. In a homogeneous catalysis the catalyst and the reactants are in the same
1. Condition 2. Phase 3. Energy 4. system
12. Which one of the following is not an example of homogeneous catalysis?
1. Formation of SO_3 in lead chamber process
2. Formation of SO_3 in contact process
3. Hydrolysis of an ester in presence of an acid
4. Hydrolysis of sugar in presence of sulphuric acid
13. Which of the following is not involved in a heterogeneous catalysis?
1) Adsorption of reactants.
2) Diffusion of reactants along the surface
3) Reaction at the active site to form adsorbed product.
4) Decomposition of the catalyst
14. Which statement is wrong for heterogeneous catalysis?
1. Adsorption of reactants
2. Diffusion of products
3. Reaction at an active site to form product
4. Absorption of the product

15. Catalyst used in the manufacture of HNO_3 by Ostwald's process is

1. Rh 2. Pd 3. Fe 4. Pt

16. If Pt is used as catalyst in the decomposition of, H_2O_2 then it is an example of

1. Homogeneous catalysis
2. Heterogeneous catalysis
3. Negative catalysis
4. Auto catalysis

17. Which is an example of autocatalyst?

- 1) Hydrolysis of ethyl acetate
2) Decomposition of arsine
3) Oxidation of oxalic acid by acidified KMnO_4 4) All

18. In the titration between oxalic acid and acidified potassium permanganate, the manganous salt formed during the reaction catalyses the reaction. The manganous salt acts as

- 1) A promoter 2) A positive catalyst 3) An auto catalyst 4) catalytic poison

19. In the reaction



Product, Mn^{+2} acts as

1. Positive catalyst 2. Negative catalyst
3. Auto Catalyst 4. Induced catalyst

20. In the hydrolysis of an ester, the reaction is catalyzed by the acetic acid formed. It is an example of

1. Autocatalysis 2. Positive catalysis
3. Anticatalyst or catalysis 4. Positive catalyst

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

1. MnO_2 decomposes to give oxygen
2. MnO_2 provides heat
3. Better contact is provided by MnO_2
4. MnO_2 acts as catalyst

- 22. A finely divided state of the catalyst is more efficient because in this state**
1. More surface area is available
 2. More energy is stored in the catalyst
 3. Positive charge is acquired
 4. Negative charge is acquired
- 23. In a reversible reaction, a catalyst increases the rate of**
1. Forward reaction only
 2. Backward reaction only
 3. Forward and Backward reactions equally
 4. Can not participate in a reaction
- 24. A catalyst works well in powdered state, because**
1. No of active centers decreases
 2. No of active centers increases
 3. Surface area decreases
 4. It contains smooth surface
- 25. Which of the following statements is not true**
1. The action of the catalyst is specific
 2. The catalyst does not alter the equilibrium
 3. A small amount of the catalyst is sufficient to catalyze large amounts of reactants
 4. The catalyst initiates the reaction
- 26. The substance which reduces or even destroys the activity of a catalyst is called**
1. Auto catalyst
 2. Catalytic poison
 3. Negative catalysis
 4. Enzyme catalysis
- 27. Catalytic poison acts by**
1. Its reaction with product
 2. Its reaction with reactant
 3. Getting adsorbed on the active centers of the catalyst
 4. Coagulating the catalyst
- 28. Tetra ethyl lead increases the anti knocking property of petrol. Here it acts as**
1. Positive catalyst
 2. Negative catalyst
 3. Auto catalyst
 4. Induced catalyst

29. Which of the following exhibits specific activity in a catalytic reaction?

- 1) Catalyst
- 2) Promoter
- 3) Catalyst poison
- 4) All the three

30. In contact process of manufacture of in presence of H_2SO_4 Pt as catalyst, As_2O_3 acts as

- 1. Negative catalyst
- 2. Inhibitor
- 3. Catalytic poison
- 4. Promoter

31. The auto catalyst in the decomposition of Arsene to Arsenic and H_2 is

- 1) As_2O_3
- 2) As
- 3) H_2
- 4) As

32. In the Haber's process for the manufacture of, the following catalyst is used

- 1. Platonized asbestos
- 2. Iron with molybdenum as promoter
- 3. Copper oxide
- 4. Alumina

33. Protons accelerate the hydrolysis of esters. This is an example of

- 1. A promoter
- 2. A heterogeneous catalyst
- 3. An acid-base catalyst
- 4. An induced catalyst

34. In the decomposition of H_2O_2 which of the following acts as negative catalyst

- 1) MnO_2
- 2) Glycerol
- 3) Al_2O_3
- 4) Iron

35. CH_3CHO in vapour phase under goes decomposition in the presence of I_2 vapour and gives.

- 1) Acetic acid
- 2) ethyl alcohol
- 3) Only CH_4
- 4) CH_4 & CO

36. For a reaction occurring on the surface of a catalyst, the rate

- 1) Decreases with surface area
- 2) Does not change with surface area.
- 3) Increases with surface area
- 4) May increase or decrease depending on the nature of reaction

37. In the Ostwald process for the manufacture of HNO_3 , the catalyst used is

- 1. Fe
- 2. Pt
- 3. V_2O_5
- 4. Mo

38. Which of the following acts as negative catalyst?

- 1. Lead tetra ethyl as antiknock compound
- 2. Glycerol in the decomposition of H_2O_2
- 3. Ethanol in the oxidation of chloroform
- 4. All of the above

39. In which of the following reactions a catalyst is required

1. $S + O_2 \rightarrow SO_2$
2. $C + O_2 \rightarrow CO_2$
3. $2SO_2 + O_2 \rightarrow 2SO_3$
4. All of the above

40. In Lead-Chamber process the catalyst is

1. NO only
2. NO_2 Only
3. Mixture of NO & NO_2
4. N_2O_5

41. In which of the following process, a catalyst is not used

1. Haber process
2. Deacon's process
3. Solvay process
4. Lead chamber process

42. In Haber's process of Ammonia synthesis, the substance that acts as catalytic poison

- 1) Fe_2O_3
- 2) As_2O_3
- 3) CO_2
- 4) H_2S

43. Organic catalysts differ from inorganic catalysts

1. By acting at high temperature
2. By acting at low temperature
3. Being used up
4. Being protenious in nature

44. Platinum is not used as a catalyst in the

- 1) Oxidation of
- 2) Oxidation of
- 3) Oxidation of ammonia to nitric oxide
- 4) Synthesis of ammonia from

45. The catalytic enzyme that converts glucose and fructose into ethyl alcohol in the presence of

- 1) invertase
- 2) diastase
- 3) maltase
- 4) zymase

46. ASSERTION (A): +Ve catalyst increases the rate of reaction

REASON (R): +Ve catalyst decreases the activation energy of the Reactants.

- 1) A and R are correct and R is the correct explanation of A
- 2) A and R are correct and R is not the correct explanation of A
- 3) A is true and R is false
- 4) A is false and R is true

47. **ASSERTION (A): catalyst is more effective in the powdered state**

REASON (R): In the powdered state surface area is maximum

- 1) A and R are correct and R is the correct explanation of A
- 2) A and R are correct and R is not the correct explanation of A
- 3) A is true and R is false
- 4) A is false and R is true

48. **The catalyst iron employed in the Haber's process contains molybdenum. Whose function is**

1. To increase the rate of combination of gases
2. To counter balance for the presence of impurities in the gases
3. To act as a catalyst promoter and increase activity of catalyst
4. To make up for the adverse temperature and pressure conditions.

Types of catalysis

49. **Which one of the following is not a homogeneous catalytic reaction?**

- 1) Manufacture of H_2SO_4 by lead chamber process
- 2) Acid catalysed hydrolysis of ester
- 3) Inversion of cane sugar in the presence of mineral acid
- 4) Manufacture of H_2SO_4 by contact process

50. **Catalysis in the oxidation of $SO_2 \rightleftharpoons SO_3$ in lead chamber process**

1. Acid-base catalysis
2. Homogeneous catalysis
3. Heterogeneous catalysis
4. Induced catalysis

51. **Match the following**

List - I

A) Ammonia preparation

B) Hydrogenation

C) Fermentation

D) $SO_2 + \frac{1}{2}O_2 \xrightarrow{NO} SO_3$

List - II

1. Bio catalysed

2. Fe

3. Ni

4) Homogeneous

- | | A | B | C | D |
|----|---|---|---|---|
| 1) | 4 | 3 | 1 | 2 |
| 2) | 3 | 2 | 1 | 4 |
| 3) | 1 | 2 | 4 | 3 |
| 4) | 2 | 3 | 1 | 4 |

52. Which of the following types of metals make the most efficient catalysts?

1. Transition metals 2. Alkali metals
3. Alkaline earth metals 4. Radio active metals

53. The catalyst used in the hydrogenation of oils is

1. V_2O_5 2. Fe 3. Co 4. Ni

KEY

1) 2 2) 2 3) 1 4) 1 5) 3

6) 3 7) 4 8) 4 9) 2 10) 3

11) 3 12) 2 13) 4 14) 4 15) 4

16) 2 17) 4 18) 3 19) 3 20) 1

21) 4 22) 1 23) 3 24) 2 25) 4

26) 2 27) 3 28) 2 29) 4 30) 3

31) 2 32) 2 33) 3 34) 2 35) 4

36) 3 37) 2 38) 4 39) 3 40) 3

41) 3 42) 4 43) 2 44) 4 45) 4

46) 1 47) 1 48) 3 49) 4 50) 2

51) 4 52) 1 53) 4

Colloidal State: Distinction between True Solutions, Colloids and Suspensions, Lyophilic, Lyophobic, Multi Molecular, And Macromolecular Colloids

1. Which of the following is a crystalloid?
1) Gum 2) albumin 3) urea 4) glue
2. Which of the following is not a colloid?
1) Milk 2) blood
3) ice cream 4) sugar solution
3. Crystalloid and colloid can be distinguished by
1) diffusion 2) particle size
3) chemical composition 4) solubility
4. The particle size of the solute is less in
1) suspension 2) colloid
3) true solution 4) same in all states
5. Colloidal systems are
1) Homogeneous 2) heterogeneous
3) Suspensions 4) transparent
6. Example of a homogeneous system is
1) Muddy water 2) milk
3) Concrete 4) sugar solution
7. Which of the following is a clear solution?
1) Colloid 2) true solution
3) Suspension 4) suspensions of precipitate
8. The number of phases in a colloidal system is
1) 1 2) 2 3) 3 4) 4
9. A colloidal solution always has at least
1) one phase 2) more than two phases
3) a true solution 4) two phases
10. Particles of which of the following do not pass through filter paper?
1) colloids 2) true solutions
3) suspensions 4) colloids and suspension
11. The particles of which of the following do not diffuse at all?
1) True solution 2) Colloid
3) Suspension 4) Blood

- 12. The Tyndall effect in colloidal solutions is due to**
- 1) Scattering of light
 - 2) reflection of light
 - 3) Absorption of light
 - 4) Electrical charge of particles
- 13. The Tyndall effect is not observed in**
- 1) Emulsions
 - 2) lyophobic sols
 - 3) Suspensions
 - 4) true solutions
- 14. Which of the following is a homogeneous system?**
- 1) Suspension
 - 2) colloid solution
 - 3) True solution
 - 4) starch solution
- 15. A colloidal system in which solid is dispersed in a liquid is called**
- 1) Precipitate
 - 2) sol
 - 3) emulsion
 - 4) gel
- 16. When dispersed phase is solid and dispersion medium is gas, the colloidal system is**
- 1) Smoke
 - 2) clouds
 - 3) Emulsion
 - 4) milk
- 17. The colloidal system in which the dispersed phase and dispersion medium are both liquids is known as**
- 1) a gel
 - 2) an aerosol
 - 3) an emulsion
 - 4) a foam
- 18. When the dispersion medium is alcohol, the colloidal sol is known as**
- 1) Hydrosol
 - 2) benzosol
 - 3) alcocol
 - 4) aquasol
- 19. When dispersed phase is liquid and dispersion medium is a solid, the colloid is known as**
- 1) a solution
 - 2) an emulsion
 - 3) a gel
 - 4) a foam
- 20. A colloidal solution in which a solid is dispersed in a liquid is called**
- 1) Gel
 - 2) emulsion
 - 3) sol
 - 4) precipitate
- 21. Milk is an example of**
- 1) Emulsion
 - 2) suspension
 - 3) Gel
 - 4) true solution
- 22. The dispersed phase in milk is**
- 1) Water
 - 2) liquid fat
 - 3) Protein
 - 4) water in oil

23. Gel is a sol

- 1) liquid in solid 2) solid in liquid
- 3) solid in solid 4) solid in gas

24. An aerosol is a colloidal system of

- 1) a liquid dispersed in a solid
- 2) a liquid dispersed in a gas
- 3) a gas dispersed in a gas
- 4) a solid dispersed in liquid

25. Blood is a colloidal solution of water containing

- 1) Liquid fat as dispersed phase
- 2) Albuminoid as dispersed phase
- 3) Butter as dispersed phase
- 4) Proteins as dispersed phase

26. When the dispersed phase has a greater affinity for the dispersion medium, the colloids are termed as

- 1) Lyophilic 2) Lyophobic
- 3) Hydrophobic 4) Emulsion.

27. Substances whose solutions can readily diffuse through animal membranes are called as

- 1) Colloids 2) Crystalloids
- 3) Electrolytes 4) Non-electrolytes

28. In hydrosols water acts as

- 1) Colloidal particle 2) Dispersion medium
- 3) Suspensions only 4) Dispersed phase

29. Micelles contain

- 1) Discrete particles 2) Discrete ions
- 3) Aggregate of particles
- 4) Associated water molecules

30. Formula of sodium stearate is

- 1) $C_{12}H_{25}OSO_3Na$ 2) $C_{12}H_{21}OSO_3Na$
- 3) $C_{17}H_{35}COONa$ 4) $C_{17}H_{35}SO_3Na$

31. When more sodium stearate is dissolved in water the nature of the solution is

- 1) True solution 2) suspension
- 3) Emulsion 4) colloidal solution

32. Medicinal Cod liver oil is an example of

- 1) emulsion 2) adsorbent
3) aerosol 4) gaseous sol

33. Cold cream is an example of

- 1) Oil in water emulsion 2) oil in oil emulsion
3) Water in oil emulsion 4) emulsifier

34. Vanishing cream is an example of

- 1) o/w emulsion 2) solid in a liquid sol.
3) W/o emulsion 4) liquid in a solid sol.

35. The emulsifier for olive oil in water emulsion is

- 1) Soap 2) egg albumin
3) Mercuric iodide 4) kerosene

36. Soap emulsifies

- 1) Oil in water type 2) water in oil type
3) Oil in oil type 4) gel in oil

37. Water in benzene is emulsified by

- 1) Soap 2) mercuric iodide
3) Egg albumin 4) grease

38. The viscosity of a lyophobic sol is __ its dispersion medium

- 1) Equal to that of 2) Greater than that of
3) Less than that of 4) Exactly twice that of

39. Which is an aerosol?

- 1) Cloud 2) Blood 3) Milk 4) Gold sol

40. Which is prepared by Bredig's method?

- 1) Gold sol 2) Starch sol
3) Cod liver oil 4) Cold cream

41. Tyndal effect is shown by

- 1) Sugar solution 2) Common salt solution
3) Gold sol 4) Water

42. Dispersion medium in blood is

- 1) RBC 2) WBC
3) Hemoglobin 4) Water

43. Which is a "W/O" type emulsion?

- 1) Cold cream 2) Milk
- 3) Blood 4) Cloud

44. Emulsifier in milk is

- 1) Starch 2) Sucrose
- 3) Caesin 4) Lactose

45. The hydrophobic end of lauryl sulphate is

- 1) $C_{17}H_{35}$ 2) $C_{17}H_{33}$
- 3) $C_{12}H_{25}$ 4) $-OSO_3^{--}$

46. Vanishing cream is

- 1) lyophilic solutions 2) Lyophobic sol
- 3) W/O emulsion 4) O/W emulsion

47. Concentrated soap solution consists of

- 1) Individual soap ions 2) Micelles
- 3) Dimers of soap ions 4) Flat type patterns of soap ions

48. Which of the following may form associated colloids?

- 1) Gold 2) Soap 3) Starch 4) Glucose

49. Most common emulsifier for vegetable oil in water emulsion is

- 1) Carbon powder 2) HgI_2
- 3) Soap 4) Lyophobic colloid

50. Emulsifying agents are generally

- 1) +ve ions 2) -ve ions
- 3) Lyophobic colloids 4) Lyophilic colloids

51. Which can not act as an emulsifier?

- 1) Soap 2) Egg albumin
- 3) Gelatin 4) Water

52. Micelle is

- 1) A single +ve ion 2) A single -ve ion
- 3) An aggregate of many soap ions
- 4) An individual molecule

53. In the colloidal state, the particle size ranges from

- 1) 1 to 10 A⁰
- 2) 2000 to 5000 A⁰
- 3) 10 to 1000 A⁰
- 4) 100 - 1000 nm.

54. Particles in which of the following can be seen only with ultra microscope

- 1) True solutions
- 2) colloids
- 3) Suspensions
- 4) Both colloids and suspensions

55. The diffusion of particles in colloid is

- 1) Rapid than in true solution
- 2) Slower than in suspension
- 3) Slower than in true solution
- 4) Equal as in true solution

56. Weak tyndall effect can be observed with

- 1) Gold sol
- 2) Sulphur sol
- 3) Smoke
- 4) Starch sol

57. Smoke, cloud and gold sol are respectively

- 1) Aerosol, Hydrosol and Aquasol
- 2) Hydrosol, Hydrosol and Hydrosol
- 3) Aquasol, Aerosol and Hydrosol
- 4) Aerosol, Aerosol and Hydrosol

58. Which of the following is not a colloidal solution?

- 1) Smoke
- 2) ink
- 3) air
- 4) blood

59. Curd is an example of

- 1) Solution
- 2) foam
- 3) aerosol
- 4) gel

60. Fog is a colloidal solution of

- 1) Liquid particles dispersed in gas
- 2) Solid particles dispersed in liquid
- 3) Gaseous particles dispersed in solid
- 4) Solid particles dispersed in gas

61. Which is a natural colloid?

- 1) Cane sugar
- 2) Urea
- 3) NaCl
- 4) Blood

62. Butter is a colloid. It is formed when

- 1) Fat is dispersed in solid casein
- 2) Fat globules are dispersed in water
- 3) Water is dispersed in fat
- 4) Casein is suspended in water

63. Which of the following colloid system contains solid as the dispersed phase?

- 1) Smoke
- 2) clouds
- 3) Lemonade froth
- 4) boot polish

64. Water loving colloids are called

- 1) Hydrophilic
- 2) hydrophobic
- 3) Lyophobic
- 4) Lyophilic.

65. Which of the following is a hydrophilic solution?

- 1) Barium hydroxide sol
- 2) Arsenic sulphide sol
- 3) Starch sol
- 4) Silver Chloride sol

66. Colloidal solution of Arsenic Sulphide is an example of

- 1) Lyophobic sol
- 2) hydrophilic sol
- 3) Aerosol
- 4) Lyophilic solution

67. Which of the following is an example for hydrophobic sol

- 1) Starch sol
- 2) gum
- 3) Protein sol
- 4) arsenic sulphide sol

KEY

- 1) 3 2) 4 3) 1 4) 3 5) 2 6) 4 7) 2 8) 2 9) 4 10) 4
- 11) 3 12) 1 13) 4 14) 3 15) 2 16) 1 17) 3 18) 3 19) 3 20) 3
- 21) 1 22) 2 23) 1 24) 2 25) 2 26) 1 27) 1 28) 2 29) 3 30) 3
- 31) 4 32) 1 33) 3 34) 1 35) 2 36) 1 37) 2 38) 2 39) 1 40) 1
- 41) 3 42) 4 43) 1 44) 3 45) 3 46) 4 47) 2 48) 2 49) 3 50) 4
- 51) 4 52) 3 53) 3 54) 2 55) 3 56) 4 57) 4 58) 3 59) 4 60) 1
- 61) 4 62) 3 63) 1 64) 1 65) 3 66) 1 67) 4