RAVI MATHS TUITION CENTRE , WHATSAPP - 8056206308

Time : 1 Mins **SURFACE CHEMISTRY 1** **Marks : 692**

1. Which of the following is less than zero during adsorption?
   a) △G b) △S c) △H d) All of these
2. The coagulation value in millimoles per liter of the electrolytes used for the coagulation of As_2S_3 are given below:
   I. (NaCl) = 52
   II. ($BaCl_2$) = 0.69
   III. ($MgSO_4$) = 0.22
   The correct order of their coagulating power is
   a) I > II > III b) II > I > III c) III > II > I d) III > I > II
3. Which of the following forms cationic micelles above certain concentration?
   a) Sodium dodecyl sulphate b) Sodium acetate c) Urea
   d) Cetyl timethyl ammonium bromide
4. The values of colligative properties of colloidal solution are of small order in comparison to those shown by true solutions of same concentration because of colloidal particles
   a) exhibit enormous surface area b) remain suspended in the dispersion medium
   c) form lyophilic colloids d) are comparatively less in number
5. Which of the following processes does not occur at the interface of phases?
   a) Crystallisation b) Heterogeneous catalysis c) Homogeneous catalysis
   d) Corrosion
6. Why is gelatin mixed with gold sol?
   a) Gold sol is lyophobic sol, gelatin acts as stabilising agent.
   b) Gold sol is lyophilic sol, gelatin acts as stabilising agent.
   c) Gelatin produces negative charge on gold particles in gold sol.
   d) Gelatin helps gold sol to get its critical micelle concentration.
7. **Assertion:** Physical adsorption increases with increase in temperature.
   Reason: Physical adsorption is an endothermic process.
   a)
   If both assertion and reason are true and reason is the correct explanation of assertion.
   b)
   If both assertion and reason are true but reason is not the correct explanation of assertion.
   c) If assertion is true but reason is false. d) If both assertion and reason are false.
8. According to the adsorption theory of catalysis, the speed of the reaction increases because

a) Adsorption lowers the activation energy of the reaction

b)

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

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

d) Adsorption produces heat which increase the speed of the reaction

9. Shape-selective catalysis is a reaction catalysed by

   a) zeolites b) enzymes c) platinum d) Ziegler- Natta catalyst

10. Which of the following is not the correct difference between lyophobic and lyophilic sols?

    a)

Lyophobic sols	Lyophilic sols
Require special methods for preparation	Can be prepared by shaking with the solvent

    b)

Lyophobic sols	Lyophilic sols
Are reversible	Are irreversible

    c)

Lyophobic sols	Lyophilic sols
Easily coagulated by electrolytes	coagulated

    d)

Lyophobic sols	Lyophilic sols
Are less stable	Are more stable

11. At high concentration of soap in water, soap behaves as_____

    a) molecular colloid b) associated colloid c) macromolecular colloid

    d) lyophilic colloid

12. $Fe(OH)_3$ sol can be more easily coagulated by Na_3PO_4 in comparison to KCl because

    a) mass of Na_3PO_4 is more than KCl hence it is more effective than KCl

    b)

    phosphate ion (PO^{3-}_4) has higher negative charge than Cl ion hence are more effective for coagulation

    c) KCl is more soluble than Na_3PO_4 hence less effective for coagulation

    d) Na+ ions are more effective than K+ ions for coagulation

13. **Assertion:** Solids in finely divided state act as good adsorbents.

    Reason: Adsorption is a surface phenomenon.

    a)

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

    b)

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

    c) If assertion is true but reason is false. d) If both assertion and reason are false.

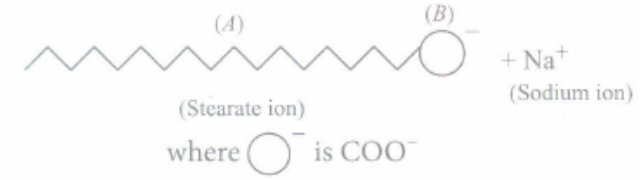
14. Fill in the blanks by putting appropriate choices:

    During adsorption there is _____ in enthalpy and _____ in the entropy of a system but adsorption is a spontaneous process and thus II G must be_____ .Rate of physisorption _____ with increase in pressure.

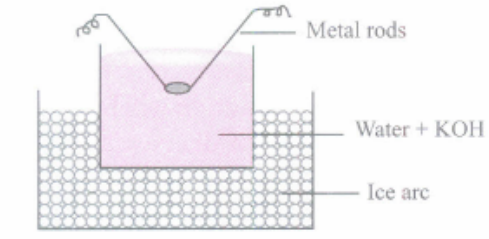
    a) decrease, decrease, negative, increases b) increase, increase, positive, decreases

    c) decrease, increase, negative, decreases d) increase, decrease, positive, increases

15. Which of the following statements is/are correct regarding stability of sol?
    (i) Lyophilic sols are stabilised due to a layer of solvent around sol particles.
    (ii) Lyophobic sols are stabilised due to presence of charge.
    (iii) Addition of lyophilic brings in more stability to lyophobic.
    (iv) Addition of lyophobic brings in more stability to lyophobic.
    a) (ii) only b) (i) and (iv) only c) (i), (ii) and (iii) only d) All of these.
16. In the given figure label the parts.



    a) A - Hydrophilic tail, B - hydrophobic head
    b) A - Hydrophobic tail, B - hydrophobic head
    c) A - Hydrophobic tail, B - hydrophilic head d) A - Hydrophilic tail, B - hydrophilic head
17. Tyndall effect is not observed in
    a) smoke b) emulsions c) sugar solution d) gold sol.
18. **Assertion:** Lyophilic colloids have a unique property of protecting lyophobic colloids.
    Reason: Lyophilic colloids are extensively solved.
    a)
    If both assertion and reason are true and reason is the correct explanation of assertion.
    b)
    If both assertion and reason are true but reason is not the correct explanation of assertion.
    c) If assertion is true but reason is false. d) If both assertion and reason are false
19. Which of the following is not a favourable condition for physical adsorption?
    a) High pressure b) Negative △H c) Higher critical temperature of adsorbate
    d) High temperature
20. Some medicines are more effective in the colloidal form because of
    a) the charged colloidal particles present in it
    b) the large surface area and easy assimilation
    c) precipitation of medicine in the blood
    d) the stabilisation of medicine in colloidal form
21. In Bredig's arc method an electric arc is struck between the metal electrodes under the surface of water containing some stabilizing agent. The process involves



    a) mechanical dispersion b) condensation c) both dispersion and condensation
    d) ultrasonic dispersion.
22. Which of the following statements is correct about solid catalysts?

a) Catalyst is required in equal amount as the reactants present in the reaction.

b)

Catalytic activity of a solid catalyst does not depend upon the extent of chemisorption.

c) Desorption is not important for a solid to act as good catalyst.

d) Same reactants may give different products by using different catalysts.

23. Movement of dispersion medium under the influence of electric field is known as

a) electrodialysis b) electrophoresis c) electroosmosis d) cataphoresis.

24. The term activation of adsorbent is used when

a)

adsorbing power is increased by increasing surface area by making the surface rough

b) adsorbing power is increased by dipping the surface in acid to make it smooth

c) adsorbing power is increased by dissolving it in water

d) adsorbing power is decreased to reduce the extent of adsorption

25. If a beam of light is passed through true solution, then it is

a) visible b) scatter c) not visible d) None of the above

26. Plot of log xlm against log p is a straight line inclined at an angle of 45°. When the pressure is 0.5 atm and Freundlich parameter, k is 10, the amount of solute adsorbed per gram of adsorbent will be (log 5 = 0.6990).

a) 5g b) 3g c) 6g d) 12g

27. Which of the following factors contribute towards higher stability of lyophilic colloid?

a) Charge on their particles b) Attractive forces between particles

c) Small size of their particles d) High solvation due to a layer of dispersion medium

28. At the equilibrium position in the process of adsorption _____

a) $\Delta H>O$ b) $\Delta H=T\Delta S$ c) $\Delta H> T\Delta S$ d) $\Delta H< T\Delta S$

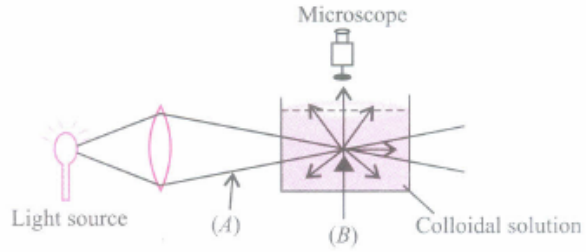
29. Which of the following is not correct regarding the adsorption of a gas on the surface of solid?

a) On increasing pressure, adsorption keeps on increasing.

b) Enthalpy and entropy changes are negative.

c) Chemisorption is more specific than physisorption. d) It is a reversible reaction.

30. When a colloidal solution is viewed from the direction at right angles of light beam, the path of the beam is illuminated due to scattering of light. In the figure (A) and (B) are



a) A - Tyndall cone, B - Scattered light b) A - Scattered light, B - Tyndall cone

c) A - Tyndall cone, B - Blind spot d) A - Tyndall effect, B - Tyndall cone

31. **Assertion:** Zeolites are good shape-selective catalysts.

Reason: Zeolites have honeycomb-like structures.

a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

32. Powdered substances are more effective adsorbents than their crystalline form because
a) adsorption is an exothermic process
b) they become inert and do not react with the adsorbate
c) the extent of adsorption increases with increase in surface area of the adsorbent
d) adsorption is more if the size of adsorbent is small.

33. Position of non-polar and polar part in micelle is
a) Polar at outer surface and non-polar at inner surface.
b) Polar at inner surface and non-polar at outer surface
c) Distributed all over the surface d) Present in the surface only

34. Which of the following statements is not correct for chemisorption and physisorption?
a)
Physical adsorption occurs at a low temperature and chemisorption occurs at all temperatures.
b)
Magnitude of chemisorption decreases with rise in temperature while physisorption increases with rise in temperature.
c) Chemisorption is irreversible and physisorption is reversible.
d) In physisorption activation energy is low while in chemisorption it is high

35. Which one of. the following statements is incorrect about enzyme catalysis?
a) Enzymes are mostly proteinous in nature b) Enzyme action is specific
c) Enzymes are denaturated by UV - rays and at high temperature
d) Enzymes are least reactive at optimum temperature

36. Which of the following electrolytes will have maximum coagulating value for AgI/ Ag^+ sol?
a) Na_2S b) Na_3PO_4 c) Na_2SO_4 d) NaCl

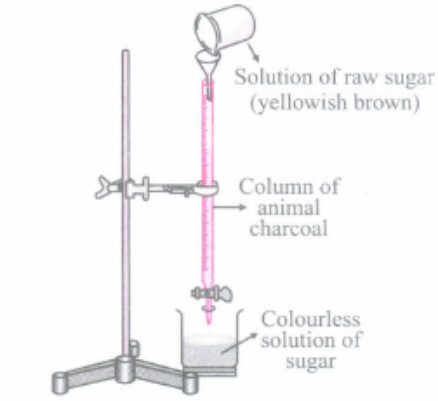
37. The oxide of nitrogen which acts as a catalyst in lead chamber process is
a) NO b) NO_2 c) NP_4 d) N_2

38. **Assertion:** In physical adsorption, enthalpy of adsorption is very low.
Reason: In physical adsorption, attraction between gas molecules and solid surface is due to weak van der Waals forces.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

39. Why is alum added to water containing suspended impurities?

a) To make a colloidal solution b) To coagulate the suspended impurities
c) To remove impurities of calcium and magnesium
d) To protect the colloidal solution from getting precipitated

40. Which of the following phenomenon is applicable to the process shown in the figure?



a) Absorption b) Adsorption c) Coagulation d) Emulsification

41. Which of the following gases is least adsorbed on charcoal?
a) HCl b) NH_3 c) O_2 d) CO_2

42. On adding $AgNO_3$ solution to KI solution, a negatively charged colloidal sol will be formed in which of the following conditions?
a) 100 mL of 0.1 M $AgNO_3$ + 100 mL of 0.1 M KI
b) 100 mL of 0.1 M $AgNO_3$ + 50 mL of 0.2 M KI
c) 100 mL of 0.2 M $AgNO_3$ + 100 mL of 0.1 M KI
d) 100 mL of 0.1 M $AgNO_3$ + 100 mL of 0.15 M KI

43. The protecting power of lyophilic colloidal sol is expressed in terms of
a) Oxidation number b) Coagulation value c) Gold number
d) Critical miscelle concentration

44. If x is amount of adsorbate and m is amount of adsorbent, which of the following relations is not related to adsorption process?
a) $\frac{x}{m}$ = f (T) at constant p b) p = f (T) at constant $\left(\frac{x}{m}\right)$ c) $\frac{x}{m}$ = p x T
d) $\frac{x}{m}$ = f (p) at constant T

45. Which of the following forms cationic micelles above certain concentration?
a) Sodium ethyl sulphate b) Sodium acetate c) Urea
d) Cetyl trimethyl ammonium bromide

46. Fill in the blanks by putting appropriate choices. Blood is a colloidal solution of an____(i)_____ substance. The styptic action of _____(ii)_____ and ____(iii)_____ solution is due to _____(iv)_____ of blood forming a clot which stops further bleeding.

a)

(i)	(ii)	(iii)	(iv)
albumoid	aluminium	ferrous chloride	peptization

b)

(i)	(ii)	(iii)	(iv)
albumoid	alum	ferric chloride	coagulation

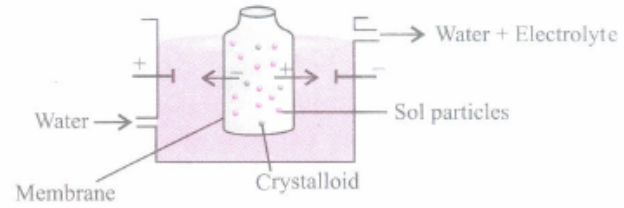
c)

(i)	(ii)	(iii)	(iv)
electrolytic	alum	ferric chloride	circulation

d)

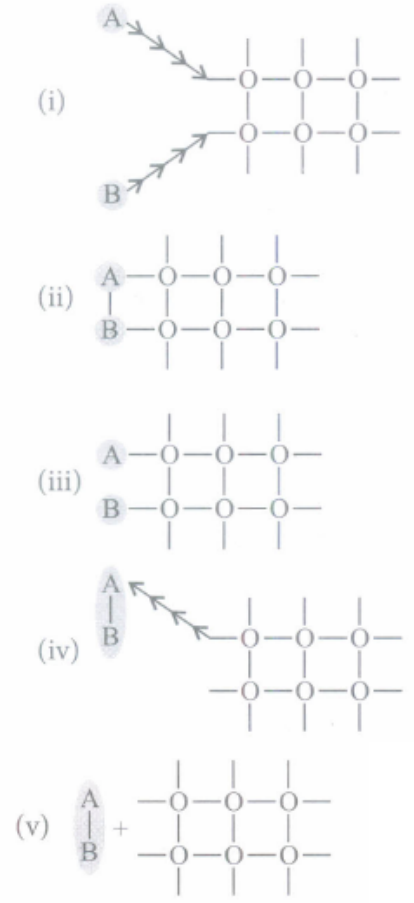
(i)	(ii)	(iii)	(iv)
negatively charged	chrome alum	sodium chloride	coagulation

47. Which of the following statements does not show correct difference between adsorption and absorption?
    a)
    In adsorption, the substance is concentrated only at the surface while in absorption it is uniformly distributed in the bulk.
    b) Adsorption is instantaneous while absorption is a slow process
    c)
    A substance can be adsorbed as well as absorbed simultaneously and the process is called sorption.
    d) Only gases are adsorbed while solids and liquids are absorbed.
48. Which of the following is application of adsorption in chemical analysis?
    a) Adsorption indicators b) Thin layer chromatography c) Qualitative analysis
    d) All of these
49. Which of the processes is being shown in the figure?



    a) Electrodialysis b) Dialysis c) Electroosmosis d) Electrophoresis
50. Why is ferric hydroxide colloid positively charged when prepared by adding ferric chloride to hot water?
    a) Due to precipitation of ferric hydroxide there is an excess of Fe^{3+} ions.
    b) Due to preferential adsorption of Fe^{3+} ions by the sol of $Fe(OH)_3$.
    c) Due to absence of any negatively charged ion.
    d) Due to adsorption of OH^- and Cl^- ions, the remaining sol has only Fe^{3+} ions.
51. A lyophobic colloid cannot be formed by
    a) mixing dispersed phase and dispersion medium
    b) chemical reactions like hydrolysis c) exchange of solvent d) peptisation
52. The formation of micelles takes place only above
    a) critical temperature b) Kraft temperature c) inversion temperature
    d) absolute temperature

53. Arrange the following diagrams in correct sequence of steps involved in the mechanism of catalysis, in accordance with modern adsorption theory.



a) (i)⟶ (ii)⟶ (iii)⟶ (iv)⟶ (v) b) (i)⟶ (iii)⟶ (ii)⟶ (iv)⟶ (v)
c) (i)⟶ (iii)⟶ (ii)⟶ (v)⟶ (iv) d) (i)⟶ (ii)⟶ (iii)⟶ (v)⟶ (iv)

54. Physical adsorption of a gaseous species may change to chemical adsorption with_____.
a) decrease in temperature b) increase in temperature
c) increase in surface area of adsorbent d) decrease in surface area of adsorbent

55. Match the column I with column II and mark the appropriate choice.

Column I		Column II	
(A)	Water-loving colloids	(i)	Irreversible
(B)	Liquid dispersed in gas	(ii)	Emulsifying agent
(C)	Hydrophobic sol	(iii)	Hydrophilic
(D)	Soap	(iv)	Aerosol
(E)	Micelles	(v)	Coagulation
(F)	Hardy-Schulze rule	(vi)	Associated colloids

a) (A)⟶ (iii), (B)⟶ (iv), (C)⟶ (i), (D)⟶ (ii), (E)⟶ (vi), (F)⟶ (v)
b) (A)⟶ (i), (B)⟶ (vi), (C)⟶ (v), (D)⟶ (iii), (E)⟶ (iv), (F)⟶ (ii)
c) (A) ⟶ (vi), (B) ⟶ (iv), (C) ⟶ (v), (D) ⟶ (ii), (E) ⟶ (iii), (F) ⟶ (i)
d) (A) ⟶ (ii), (B) ⟶ (iii), (C) ⟶ (iv), (D) ⟶ (v), (E) ⟶ (vi), (F) ⟶ (i)

56. For adsorption of a gas on a solid, the plot of log x/m vs log p is linear with slope equal to (n being whole number):
a) k b) log k c) n d) 1/n

57. Which of the following systems will show Tyndall effect?
a) Aqueous solution of sodium chloride b) Aqueous solution of aluminium hydroxide
c) Aqueous solution of glucose d) Aqueous solution of urea

58. Which of the following statements are correct?
(i) When an animal hide, which has negatively charged particles, is soaked in tannin, which contains positively charged colloidal particles, mutual coagulation does not take place.
(ii) Photographic films are prepared by coating an emulsion of the light-sensitive silver bromide in gelatin over glass plates or celluloid films.
(iii) Latex is a colloidal solution of rubber particles which are negatively charged.
(iv) In Cottrell precipitator, the smoke, before it comes out from the chimney, is led through a chamber containing plates having a charge opposite to that carried by smoke particles. The particles on coming in contact with these plates acquire some charge and do not get precipitated.
a) (i) and (iv) only b) (ii) and (iii) only c) (ii), (iii) and (iv) only d) All of these.

59. Match the column I with column II and mark the appropriate choice

Column I		Column II	
(A)	Friedel Crafts reaction	(i)	Silica gel
(B)	Humidity control	(ii)	$\frac{x}{m}=kp^{1/n}$
(C)	Gas masks	(iii)	Anhydrous aluminium chloride
(D)	Freundlich adsorption isotherm	(iv)	Adsorb poisonous gas

a) (A)⟶ (i), (B) ⟶ (iii), (C) ⟶ (ii), (D) ⟶(iv)
b) (A) ⟶ (ii), (B) ⟶ (iii), (C) ⟶ (i), (D) ⟶(iv)
c) (A) ⟶ (iii), (B)⟶ (i), (C) ⟶ (iv), (D) ⟶ (ii)
d) (A) ⟶ (iv), (B) ⟶ (i), (C) ⟶ (iii), (D) ⟶ (ii)

60. Which of the following interfaces cannot be obtained?
a) Liquid-Liquid b) Solid-Liquid c) Liquid-Gas d) Gas-Gas

61. Which of the following will not form a colloidal system?
a) Solid-gas b) Liquid-gas c) Gas-gas d) Gas-liquid

62. Colloidal solutions of metals like gold can be prepared when their salt solutions react with certain substances like $SnCl_2$, formaldehyde, phenylhydrazine, etc.

$$2AuCl_3 + 3SnCl_2 \longrightarrow 3SnCl_4 + \underset{sol}{2Au}$$

The above method is an example of
a) hydrolysis method b) double decomposition method. c) reduction method
d) oxidation method

63. Which of the following statements given about emulsions is incorrect?
a)
The droplets in emulsions are often negatively charged and can be precipitated by electrolytes.
b)
Emulsion can be diluted with any amount of the dispersed liquid. On the other hand, the dispersion medium when mixed, forms a separate layer.

c)

Emulsions can be broken into constituent liquids by heating, freezing, centrifuging, etc.

d) Emulsions also show Brownian movement and Tyndall effect.

64. Match the column I and column II and mark the appropriate choice

Column I		Column II	
(A)	Diastase	(i)	Proteins⟶ peptones
(B)	Pepsin	(ii)	Glucose ⟶ ethyl alcohol
(C)	Ptyalin	(iii)	Starch ⟶ maltose
(D)	Zymase	(iv)	Starch ⟶ sugar

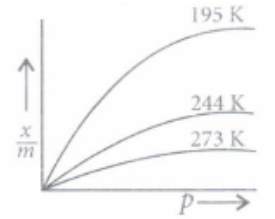
a) (A) ⟶ (iv), (B) ⟶ (ii), (C) ⟶ (i), (D) ⟶(iii)

b) (A) ⟶ (ii), (B) ⟶ (i), (C)⟶ (iv), (D)⟶ (iii)

c) (A) ⟶ (i), (B) ⟶ (ii), (C) ⟶ (iii), (D)⟶ (iv)

d) (A) ⟶ (iii), (B) ⟶ (i), (C) ⟶ (iv), (D) ⟶ (ii)

65. Observe the given adsorption isotherm carefully and choose the correct option.



(i) These curves indicate that at a fixed temperature, there is a decrease in physical adsorption with increase in pressure.

(ii) These curves always seem to approach saturation at high pressure.

(iii) $\frac{x}{m} = k.p^{1/n}(n > 1)$ is generally represented by m this isotherm.

(iv) These curves indicate that at a fixed pressure, there is a decrease in physcial adsorption with increase in temperature.

a) (i) and (iii) only b) (ii) and (iv) only c) (ii), (iii) and (iv) only d) All of these.

66. White of an egg whipped with water acts as

a) macromolecular colloid b) associated colloid c) molecular colloid

d) normal electrolytic solution

67. Match the column I with column II and mark the correct option.

Column I		Column II	
(p)	Silver sol	(i)	Kalaazar
(q)	Colloidal gold	(ii)	Stomach disorder
(r)	Milk of magnesia	(iii)	Eye lotion
(s)	Colloidal antimony	(iv)	Intramuscular injection

a) (p) - (iv), (q) - (iii), (r) -(ii), (s) - (i) b) (p) - (iv), (q) - (i), (r) -(iii), (s) - (ii)

c) (p) - (iii), (q) - (iv), (r) -(ii), (s) - (i) d) (p) - (i), (q) - (ii), (r) -(iv), (s) - (iii)

68. fog is an example of colloidal system of

a) liquid in gas b) gas in liquid c) solid in gas d) gas in solid.

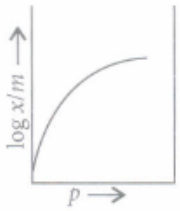
69. In physisorption adsorbent does not show specificity for any particular gas because

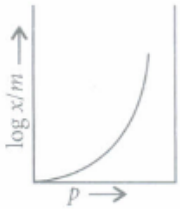
a) involved van der Waals forces are universal

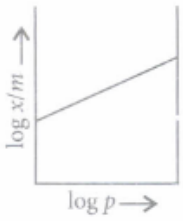
b) gases involved behave like ideal gases c) enthalpy of adsorption is low

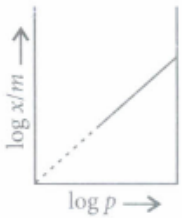
d) it is a reversible process

70. Which one of the following statements is not correct?
    a) Catalyst does not initiate any reaction
    b)
    The value of equilibrium constant is changed in the presence of a catalyst in the reaction equilibrium
    c) Enzymes catalyze mainly biochemical reaction
    d) Coenzymes increase the catalytic activity of enzyme
71. Extent of adsorption of adsorbate from solution phase increases with
    a) increase in amount of adsorbate in solution
    b) decrease in surface area of adsorbent c) increase in temperature of solution
    d) decrease in amount of adsorbate in solution
72. Which one of the following characteristics is associated with adsorption?
    a) ΔG and ΔH are negative but ΔS is positive.
    b) ΔG and ΔS are negative but ΔH is positive
    c) ΔG is negative but ΔH and ΔS are positive d) ΔG, ΔH and ΔS all are negative
73. Which of the following is not correctly matched?
    a) Gelatin - Lyophilic colloid b) Gold sol - Lyophilic colloid
    c) Arsenious sulphide - Lyophobic colloid d) Ferric hydroxide - Lyophobic colloid
74. What is the role of adsorption in froth floatation process used especially for concentration of sulphide ores?
    a) Shape selective catalysts b) Adsorption of pine oil on sulphide ore particles
    c) Adsorption of pine oil on impurities
    d) Production of heat in the process of exothermic reaction
75. The incorrect statement about physical adsorption is
    a) it lacks specificity b) it is generally reversible
    c) porous surfaces are good adsorbent d) heat of adsorption is quite high
76. Which of the following is not a method for coagulation of lyophobic sols?
    a) By electrophoresis b) By mixing oppositely charged sols c) By adding electrolyte
    d) By adding a protective colloid
77. At low pressure, the fraction of the surface covered follows
    a) zero-order kinetics b) first-order kinetics c) second-order kinetics
    d) fractional order kinetics.
78. The ratio of the number of moles of $AgNO_3$, $Pb(NO_3)_2$ and $Fe(NO_3)_3$ required for coagulation of a definite amount of a colloidal sol of silver iodide prepared by mixing $AgNO_3$ with excess of KI will be
    a) 1: 2 : 3 b) 3: 2: 1 c) 6: 3 : 2 d) 2: 3 : 6
79. Which of the following can adsorb larger volume of hydrogen gas?
    a) Finely divided platinum b) Colloidal solution of palladium
    c) Small pieces of palladium d) A single metal surface of platinum
80. Which of the following curves is in accordance with Freundlich adsorption isotherm?

a) 

b) 

c) 

d) 

81. Which one of the following is not applicable to the phenomenon of adsorption?
a) ΔH>O b) ΔG<O c) ΔS < 0 d) ΔH < 0

82. The substances which behave as colloidal solutions at higher concentration are called
a) associated colloids b) multimolecular colloids c) macromolecular colloids
d) protective colloids.

83. When an excess of a very dilute aqueous solution of KI is added to a very dilute aqueous solution of silver nitrate, the colloidal particles of silver iodide are associated with which of the following Helmholtz double layer?
a) AgI/ Ag^+ :I^- b) AgI /K^+ :NO^-_3 c) AgI/ NO^-_3 :Ag^+ d) AgI/ I^- :K^+

84. Which of the following is not an explanation for the origin of charge on the colloidal particles?
a) Due to frictional electrification b) Due to dissociation of surface molecules
c) Due to electrophoresis d) Due to selective adsorption of ions

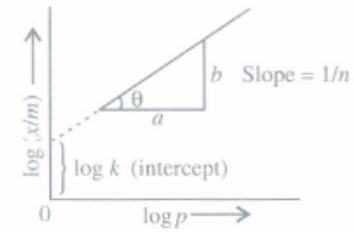
85. In the adsorption of a gas on solid, Freundlich isotherm is obeyed. The slope of the plot is zero. Thus, the extent of adsorption is
a) directly proportional to the pressure of gas
b) inversely proportional to the pressure of the gas
c) independent of the pressure of the gas
d) proportional to the square of the pressure of the gas.

86. Match the column I with column II with respect to applications of properties of colloids in different fields and mark the appropriate choice.

Column I		Column II	
(A)	Coagulation	(i)	Colloidal medicines
(B)	Adsorption	(ii)	Photographic films
(C)	Electrophoresis	(iii)	Sewage disposal
(D)	Emulsions	(iv)	Smoke precipitator

a) (A)⟶ (iii), (B) ⟶(i), (C) ⟶(ii), (D) ⟶(iv)
b) (A) ⟶ (ii), (B) ⟶ (iii), (C) ⟶ (i), (D) ⟶ (iv)
c) (A)⟶ (iii), (B)⟶ (i), (C)⟶ (iv), (D)⟶ (ii) d) (A)⟶ (i), (B)⟶ (iv), (C)⟶ (iii), (D)⟶ (ii)

87. A graph is plotted between log (x/m) and log p according to the equation $\frac{x}{m} = kp^{1/n}$



Which of the following statements about this graph is not correct?

a) The figure shows Freundlich adsorption isotherm.
b) The figure shows Langmuir adsorption isotherm.
c) The adsorption varies directly with pressure.
d) The factor l/n can have values between 0 and 1.

88. According to adsorption theory of catalysis, the rate of reaction increases with the use of a catalyst because:
a) the heat liberated during adsorption increases the rate of reaction
b) the kinetic energy of reactants increases which increases the rate of reaction
c) the activation energy of reaction increases which increases the rate of reaction
d)
the concentration of reactants at the active centres becomes high due to adsorption resulting in increase in the rate of reaction

89. Mark the incorrect combination out of the following examples of colloidal solutions
a)

Colloid	Dispersion medium	Dispersed phase
Smoke	Gas	Solid

b)

Colloid	Dispersion medium	Dispersed phase
Mist	Gas	Liquid

c)

Colloid	Dispersion medium	Dispersed phase
Gel	Liquid	Liquid

d)

Colloid	Dispersion medium	Dispersed phase
Emulsion	Liquid	Liquid

90. Lyophilic sols are also called reversible colloids because
a)
they can be reformed by mixing residue (dispersed phase) in dispersion medium even after drying
b) they can be easily precipitated from the colloidal system
c) once formed, the dispersion medium and dispersed phase cannot be separated
d) special reversible reactions are used to prepare them.

91. Identify the correct statement regarding enzymes.
a) Enzymes are specific biological catalysts that possess well defined active sites.
b) Enzymes are normally heterogeneous catalysts that are very specific in their action.
c) Enzymes are specific biological catalysts that cannot be poisoned.
d)
Enzymes are specific biological catalysts that can normally function at very high temperature (T = 1000 K).

92. Which of the following acts as the best coagulating agent for ferric hydroxide sol?
a) Potassium ferrocyanide b) Potassium chloride c) Potassium oxalate
d) Aluminium chloride

93. Soap mixed with water below critical micelle concentration behaves as:
    a) associated colloid b) macromolecular colloid c) normal electrolytic solution
    d) multimolecular colloid.
94. The method usually employed for the precipitation of a colloidal solution is:
    a) dialysis b) addition of electrolytes c) diffusion through animal membrane
    d) condensation
95. Which of the following gases present in a polluted area will be adsorbed most easily on the charcoal gas mask?
    a) H_2 b) O_2 c) N_2 d) SO_2
96. Fog is a colloidal solution of:
    a) Solid in gas b) gas in gas c) liquid in gas d) gas in liquid
97. Which of the following is an example of heterogeneous catalysis?
    a) $4NH_3 + 5O_2 \overset{Pt}{\rightarrow} 4NO + 6H_2O$ b) $2SO_2 + O_2 \overset{NO}{\rightarrow} 2SO_3$
    c) $CH_3COOCH_3 + H_2O \overset{HCl}{\rightarrow} CH_3COOH + CH_3OH$
    d) $C_{12}H_{22}O_{11} + H_2O \overset{H_2SO_4}{\rightarrow} C_6H_{12}O_6 + C_6H_{12}O_6$
98. Select the correct statements
    (i) Physical adsorption is weak, multilayer, non-directional and non-specific.
    (ii) Chemical adsorption is strong, unilayer, directional and strong.
    (iii) Chemical adsorption decreases with temperature.
    (iv) Chemical adsorption is more stronger than physical adsorption.
    a) (i) and (iii) only b) (i), (ii) and (iv) only c) (iii) only d) All of these.
99. Which of the following is not a correct match?
    a) Butter - O/W type emulsion b) Vanishing cream - O/W type emulsion
    c) Milk - O/W type emulsion d) Cream - W/O type emulsion
100. Adsorption is accompanied by the evolution of heat.So according to Le-Chatelier principle, the amount of substance adsorbed should
    a) increase with decrease in temperature b) increase with increase in temperature
    c) decrease with decrease in temperature d) be equal at all temperatures
101. Which of the following process is not responsible for the presence of electric charge on the sol particles?
    a) Electron capture by sol particles b) Adsorption of ionic species from solution
    c) Formation of Helmholtz electrical double layer
    d) Absorption of ionic species from solution
102. Method by which lyophobic sol can be protected
    a) by addition of oppositely charged sol. b) by addition of an electrolyte
    c) by addition of lyophilic sol d) by boiling.
103. **Assertion:** Physisorption of a gas adsorbed at low temperature may change into chemisorption at a high temperature.
    Reason: Usually low pressure is also favourable for chemisorption.

a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

104. Chemisorption involves formation of bond between gaseous molecules or atoms and the solid surface for which high energy is required. Thus it is also referred as:
a) chemical adsorption b) positive adsorption c) activated adsorption
d) passive adsorption.

105. **Assertion:** A colloidal sol scatters light but a true solution does not.
Reason: The particles in a colloidal sol move slowly than in a true solution.
a) If assertion is true but reason is false. b) If both assertion and reason are false.
c)
If both assertion and reason are true and reason is the correct explanation of assertion.
d)
If both assertion and reason are true but reason is not the correct explanation of assertion.

106. During dialysis
a) only solvent molecules can diffuse
b) solvent molecules, ions and colloidal parficles can diftuse
c) all kinds of particles can diffuse through the semi permeable membrane
d) solvent molecules and ions can diffuse

107. Which of the following is not a method of removing impurities from a colloidal sol?
a) Electrodialysis b) Ultrafiltration c) Ultra centrifugation d) Distillation

108. 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 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) (i) and (iv) only b) (ii) and (iii) only c) (i), (ii) and (iv) only d) All of these

109. The ability of anion to bring about coagulation of a given colloid depends upon
a) its charge b) the sign of the charge alone c) the magnitude of its charge
d) both magnitude and sign of its charge

110. Which one of the following forms micelles in the aqueous solution above certain concentration?
a) Urea b) Dodecyl trimethyl ammonium chloride c) Pyridinium chloride d) Glucose

111. Which property of colloids is not dependent on the charge on colloidal particles?
a) Coagulation b) Electrophoresis c) Electro-osmosis d) Tyndall effect

112. Match the column I with column II and mark the appropriate choice

Column I		Column II	
(A)	V_2O_5	(i)	Haber's process
(B)	Ni	(ii)	Preparation of O_2 from $KClO_3$
(C)	MnO_2	(iii)	Conversion of SO_2 to SO_3
(D)	Fe	(iv)	Hydrogenation of oils

a) (A)⟶ (i), (B)⟶ (iii), (C) ⟶ (ii), (D)⟶ (iv)
b) (A) ⟶ (ii), (B) ⟶ (i), (C)⟶ (iii), (D)⟶ (iv)
c) (A) ⟶ (iii), (B) ⟶ (iv), (C) ⟶ (ii), (D) ⟶ (i)
d) (A) ⟶ (iv), (B) ⟶ (ii), (C) ⟶ (i), (D) ⟶ (iii)

113. The protecting power of lyophilic colloidal sol is expressed in terms of:
a) coagulation value b) gold number c) critical micelle concentration
d) oxidation number

114. Which one of the following statements is correct for the spontaneous adsorption of a gas?
a) △S is negative and therefore, △H should be highly positive.
b) △S is negative and therefore, △H should be highly negative
c) △S is positive and therefore, △H should be negative
d) △S is positive and, therefore, △H should also be positive.

115. The size of colloidal particles ranges between:
a) 10^{-7} - 10^{-9} cm b) 10^{-9} - 10^{-11} cm c) 10^{-5} - 10^{-7} cm d) 10^{-2} - 10^{-3} cm

116. **Assertion:** Amylase in the presence of sodium chloride i.e., Na^+ions are catalytically very active.
Reason: Metal ions such as Na^+, Mn^{2+},CO^{2+},Cu^{2+}, etc. act as activators.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

117. In which of the following reactions heterogeneous catalysis is involved?
(I) $2SO_{2(g)} + O_{2(g)} \overset{NO_{(g)}}{\longrightarrow} 2SO_{3(g)}$
(II)$2SO_{2(g)} \overset{Pt_{(s)}}{\longrightarrow} 2SO_{3(g)}$
(III)$N_{2(g)} + 3H_{2(g)} \overset{Fe_{(s)}}{\longrightarrow} 2NH_{3(g)}$
(IV)
$CH_3COOCH_{3(l)} + H_2O_{(l)} \overset{HCl_{(l)}}{\longrightarrow} CH_3COOH_{(aq)} + CH_3OH_{(aq)}$
a) (II), (III) b) (II), (III), (IV) c) (I), (II), (III) d) (IV)

118. **Assertion:** Silica gel is used to dry air.
Reason: Silica gel absorbs moisture from air.

a)

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

b)

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

c) If assertion is true but reason is false. d) If both assertion and reason are false.

119. On the basis of data given below predict which of the following gases shows least adsorption on a definite amount of charcoal?

Gas	CO_2	SO_2	CH_4	H_2
Critical temp./K	304	630	190	33

a) CO_2 b) SO_2 c) CH_4 d) H_2

120. **Assertion:** When KI solution is added to $AgNO_3$ solution, negatively charged sol results.
Reason: Negative charge of sol is due to preferential adsorption of iodide ions from the dispersion medium.

a)

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

b)

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

c) If assertion is true but reason is false. d) If both assertion and reason are false.

121. Which of the following statements about zeolites is not correct?

a)

Zeolites are open structures of silica in which trivalent aluminium is substituted by a fraction of silicon atoms.

b) Shape selectivity of zeolites depends upon porous structure of the catalyst.

c) Zeolites are synthetic microporous aluminosilicates which do not exist naturally.

d) Zeolites are aluminosilicates having three-dimensional network.

122. **Assertion:** Lyophilic sols are reversible sols.
Reason: Lyophilic sols can be reconstituted by simply remixing the dispersed phase and dispersion medium.

a)

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

b)

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

c) If assertion is true but reason is false. d) If both assertion and reason are false.

123. Which of the following statements is not correct about 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.

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

a) Magnesium chloride solution coagulates gold sol readily than iron (III) hydroxide sol.

b) Sodium sulphate solution causes coagulation in both sols.

c) Mixing of the two sols has no effect.
d) Coagulation in both sols can be brought about by electrophoresis.

125. The Langmuir adsorption isotherm is deduced by using the assumption that:
a) the adsorption takes place in multi-layers
b) the adsorption sites are equivalent in their ability to adsorb the particles.
c) the heat of adsorption varies with coverage
d) the adsorbed molecules interact with each other

126. A colloidal system having a solid substance as a dispersed phase and a liquid as a dispersion medium is classified as_____.
a) solid sol b) gel c) emulsion d) sol

127. Which of the following is a property of physisorption?
a) High specificity b) Irreversibility c) Non-specificity d) None of these.

128. The critical micelle concentration (CMC) is defined as
a) the concentration at which micellization starts
b) the concentration at which micelle starts behaving like an electrolyte
c) the concentration at which dispersed phase is separated from dispersion medium
d) the concentration at which a colloid is converted to suspension

129. At CMC (critical micelle concentration) the surface molecules
a) dissociate b) associate c) become bigger in size due to adsorption
d) become smaller in size due to decomposition

130. When a small quantity of $FeCl_3$ solution is added to the fresh precipitate of $Fe(OH)_3$ a colloidal sol is obtained. The process through which this sol is formed is known as
a) exchange of solvent b) chemical double decomposition c) peptization
d) electrophoresis.

131. The combination of two layers of opposite charges around the colloidal particle is called Helmholtz electrical double layer. The potential difference between the fixed layer and the diffused layer of opposite charge is called
a) electrode potential b) zeta potential c) adsorption potential d) diffused potential.

132. What is the role of activated charcoal in gas masks used in mines?
a) It acts as an adsorbent for poisonous gases present in coal mines.
b) It acts as an adsorbent for coal particles present in coal mines.
c) It acts as a mask through which exhaled gases are diffused out
d) It acts as a base for scattering the light.

133. After the reaction is over between adsorbed reactants, it is important to create space for the other reactant molecules to approach the surface and react. The process responsible for this is known as
a) sorption b) desorption c) physisorption d) chemisorption

134. Freshly prepared precipitate sometimes gets converted to colloidal solution by_____.
a) coagulation b) electrolysis c) diffusion d) peptisation

135. **Assertion:** Hydrolysis of ester is an example of auto-catalytic reaction.
Reason: A catalyst speeds up the process without participating in the mechanism.

a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

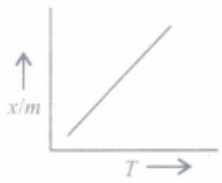
136. Which kind of catalysis can be explained on the basis of adsorption theory?
a) Homogeneous catalysis b) Heterogeneous catalysis c) Negative catalysis
d) Autocatalysis

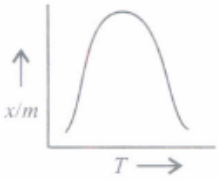
137. Which of the following graphs would yield a straight line?
a) x/m vs p b) log x/m vs p c) x/m vs log p d) log x/m vs log p

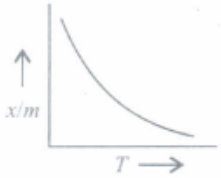
138. The activity of an enzyme becomes ineffective
a) at low temperature b) at atmospheric pressure c) at high temperature
d) in aqueous medium

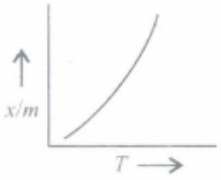
139. The separation of an emulsion into its constituent liquids is known as
a) emulsification b) protection of colloid c) coagulation d) demulsification.

140. Which of the plots is adsorption isobar for chemisorption?

a) 

b) 

c) 

d) 

141. Match the column I with column II and mark the appropriate choice

Column I		Column II	
(A)	Cheese	(i)	Liquid in gas
(B)	Dust	(ii)	Liquid in solid
(C)	Milk	(iii)	Solid in gas
(D)	Fog	(iv)	Liquid in liquid

a) (A) ⟶ (iii), (B) ⟶ (iv), (C) ⟶ (ii), (D) ⟶ (i)
b) (A) ⟶ (iv), (B) ⟶ (iii), (C) ⟶ (ii), (D) ⟶ (i)
c) (A) ⟶ (i), (B) ⟶ (ii), (C) ⟶ (iii), (D) ⟶ (iv)
d) (A)⟶ (ii), (B)⟶ (iii), (C)⟶ (iv), (D)⟶ (i)

142. The term 'sorption' stands for_____.
a) absorption b) adsorption c) both absorption and adsorption d) desorption

143. Which out of the following electrolyte solutions having the same concentration will be most effective in causing the coagulation of arsenic sulphide sol?
a) KCl b) $MgCl_2$ c) $AlCl_3$ d) Na_3PO_4

144. Traces of molybdenum are used with finely divided iron which acts as a catalyst during Haber's process for synthesis of ammonia. The Mo
a) acts as a promoter to increase the activity of the catalyst
b) acts as a poison to decrease the activity of the catalyst
c) provides a new pathway to the reaction
d) forms another intermediate compound with lesser activation energy.

145. Which of the following statement is correct for the spontaneous adsorption of a gas?
a) ΔS is negative and therefore, ΔH should be highly positive.
b) ΔS is negative and therefore, ΔH should be highly negative.
c) ΔS is positive and therefore, ΔH should be negative.
d) ΔS is positive and therefore, ΔH should be highly positive.

146. Substances which behave as normal electrolytes in solution at low concentration and exhibit colloidal properties at higher concentration are called
a) lyophilic colloids b) lyophobic colloids c) macromolecular colloids
d) associated colloids.

147. On which of the following properties does the coagulating power of an ion depend?
a) Both magnitude and sign of the charge on the ion b) Size of the ion alone
c) The magnitude of the charge on the ion alone
d) The sign of charge on the ion alone

148. Tyndall effect is observed only when
(i) the diameter of the dispersed particles is not much smaller than the wavelength of the light used.
(ii) the refractive indices of dispersed phase and dispersion medium differ greatly in magnitude.
(iii) the size of the particles is generally between 10-11 and 10-9 m in diameter.
(iv) the dispersed phase and dispersion medium can be seen separately in the system.
a) (i) and (iii) b) (i) and (iv) c) (ii) and (iii) d) (i) and (ii)

149. **Assertion:** In the coagulation of a negative sol the flocculating power is in the order: $Al^{3+} > Ba^{2+} > Na^{+}$
Reason: Greater the valence of the flocculating ion added, greater is its power to cause precipitation.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

150. Mixing of positively charged colloidal solution with negatively charged colloidal solution brings _____. The decreasing order of coagulating power of Na^{+}, Ba^{2+} and Al^{3+} for negatively charged colloidal solution is_____.
a) mutual coagulation, $Na^{+} > Ba^{2+} > Al^{3+}$ b) mutual coagulation, $Al^{3+} > Ba^{2+} > Na^{+}$
c) coagulation, $Na^{+} > Ba^{2+} > Ae^{+}$ d) peptization, $Al^{3+} > Ba^{2+} > Na^{+}$

151. Which of the following is not correct for enzyme catalysis?
a) The enzyme activity is maximum at optimum pH which is between 5-7.
b) Each enzyme is specific for a given reaction.
c) The favourable temperature range of enzyme activity is between 50-60°C.
d)
The enzymatic activity is increased in presence of certain substances called co-enzymes

152. In Freundlich adsorption equation $x/m = kp^{1/n}$, the value of n is
a) always greater than one b) always smaller c) always smaller
d) greater than one at low temperature and smaller than one at high temperature.

153. Presence of traces of arsenious oxide (AS_2O_3) in the reacting gases SO_2 and O_2 in presence of platinised asbestos in contact process acts as
a) catalytic promoter b) catalytic poison c) dehydrating agent d) drying agent.

154. At the critical micelle concentration (CMC) the surfactant molecules
a) decompose b) dissociate c) associate d) become completely soluble

155. Among the electrolytes Na_2SO_4, $CaCl_2$, $Al_2(SO_4)$ and NH_4Cl, the most effective coagulating agent for Sb_2S_3 sol is
a) Na_2SO_4 b) $CaCl_2$ c) $Al_2(SO_4)_3$ d) NH_4Cl

156. Few reactions of industrial importance are listed below. Which of the following catalysts is not correctly matched with the reaction
a) Haber's process: Finely divided Fe + Mo as promoter b) Contact process: V_2O_5
c) Ostwald's process: Fe_2O_3 d) None of these.

157. Which propers of collidal solution is independent of charge on the colloidal particles?
a) Electrophoresis b) Electro-osmosis c) Tyndall effect d) Coagulation

158. Which of the following is not an example of an emulsifying agent?
a) Proteins b) Gums c) Soaps d) Electrolytes

159. The cause of Brownian movement which is not shown by true solutions or suspensions is due to

a) unbalanced bombardment of particles by molecules of the dispersion medium
b) attractive forces between dispersed phase and dispersion medium
c) larger size of the particles due to which they keep colliding and settling down
d) conversion currents formed in the sol.

160. Which is correct in case of van der Waals adsorption?
a) High temperature, low pressure b) High temperature, high pressure
c) Low temperature, low pressure d) Low temperature, high pressure

161. Which of the following is not characteristic of chemisorption?
a) Adsorption is specific. b) Heat of adsorption is of the order of 200 kJ mol^{-1}
c) Adsorption is irreversible. d) Adsorption may be multimolecular layers.

162. Which is not correct regarding the adsorption of a gas on surface of solid
a) On increasing temperature, adsorption increase continuously
b) Enthalpy and entropy change are -ve.
c) Adsorption is more for some specific substances d) This phenomenon is reversible

163. **Assertion:** The values of colligative properties are of smaller order as compared to values shown by true solutions at same concentrations.
Reason: Colloidal particles show Brownian movement.

a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If assertion is true but reason is false.

164. Which of the following process is responsible for the formation of delta at a place where rivers meet the sea?
a) Emulsification b) Colloid formation c) Coagulation d) Peptisation

165. Measuring Zeta Potential is useful in determining which property of collodial solution
a) Size of the colloidal particles b) Viscosity c) Solubility
d) Stability of colloidal particles

166. Which of the following examples is correctly matched?
a) Butter - gel b) Smoke - emulsion c) Paint - foam d) Milk - aerosol

167. When iron hydroxide colloidal sol which is positively charged, and colloidal gold which is negatively charged are mixed, which of the following observations is not correct?
a) There is no effect of mixing the sols.
b) Mutual coagulation in both can be takes place. c) Ferric hydroxide is coagulated.
d) Gold sol is coagulated.

168. In Freundlich adsorption isotherm, the value of 1/n is:
a) between 0 and 1 in all cases b) between 2 and 4 in all cases
c) 1 in cases of physical adsorption d) 1 in case of chemisorption

169. What happens when a lyophilic sol is added to a lyophobic sol?
a) Lyophilic sol is protected. b) Lyophobic sol is protected.
c) Both the sols are coagulated. d) Electrophoresis takes place.

170. In these colloids, a large number of small atoms or smaller molecules of a substance aggregate to form colloidal particles having size in colloidal range. These colloids are known as
a) multimolecular colloids b) macromolecular colloids c) associated colloids
d) lyophilic colloids

171. **Assertion:** For stabilisation of an emulsion a third component called emulsifying agent is usually added.
Reason: Emulsions of oil in water are unstable and sometimes they separate into two layerson standing.
a)
If both assertion and reason are true and reason is the correct explanation of assertion.
b)
If both assertion and reason are true but reason is not the correct explanation of assertion.
c) If assertion is true but reason is false. d) If both assertion and reason are false.

172. Extent of physisorption of a gas increases with_____.

a) increase in temperature b) decrease in temperature
c) decrease in surface area of adsorbent
d) decrease-in strength of van der Waals forces

173. Which of the following is an example of absorption?
a) Water on silica gel b) Water on calcium chloride
c) Hydrogen on finely divided nickel d) Oxygen on metal surface