

GPLUS EDUCATION

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CHEMISTRY

SURFACE CHEMISTRY

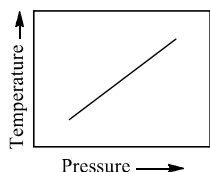
Single Correct Answer Type

- For adsorption of gas on solid surface, the plots of $\log x/m$ vs. $\log P$ is linear with a slope equal to :
a) K b) $\log K$ c) $1/nK$ d) $1/n$ (n being integer)
- Which is not correct for catalyst? It :
a) Enhances the rate of reaction in both directions
b) Changes enthalpy of reaction
c) Reduces activation energy of reaction
d) Specific in nature
- The magnitude of colligative properties in all colloidal dispersions isthan solution :
a) Higher b) Lower c) Both (a) and (b) d) None of these
- Which one is hydrophobic in nature?
a) Gelatin b) Sulphur c) Starch d) Protein
- $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightleftharpoons{\text{V}_2\text{O}_5}$ is an example for
a) Neutralization reaction b) Homogeneous catalysis
c) Heterogeneous catalysis d) Irreversible reaction
- Decomposition of urea into NH_3 and CO_2 is followed by the action of enzyme :
a) Urease b) Pepsin c) Trypsin d) None of these
- 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) Decrease with increase in temperature
- Which one of the following equation represents Freundlich adsorption isotherm?
a) $\frac{x}{m} = kp$ b) $\frac{x}{m} = kp^n$ c) $\log \frac{x}{m} = kp^n$ d) $\log \frac{x}{m} = kn \log p$
- The number of moles of lead nitrate needed to coagulate 2 moles of colloidal $[\text{AgI}]\text{I}^-$ is
a) 2 b) 1 c) $1/2$ d) $2/3$
- Surfactant molecules or ions cluster together as micelles which
a) Due to their hydrophilic tails tend to congregate
b) Due to their hydrophobic heads provide protection
c) Are colloid sized clusters of molecules
d) None of the above
- The temperature above which micelle formation occurs is :
a) Critical temperature
b) Charles' temperature
c) Inversion temperature
d) Kraft's temperature
- By dividing the catalyst into fine powder there will be increase in
a) Surface area b) Free valencies c) Active centres d) All of these
- Washing soap can be prepared by saponifying alkali with oil of :
a) Rose oil b) Paraffin oil c) Ground nut oil d) kerosene
- Platinum is used as a catalyst in :

- a) Oxidation of ammonia to form nitric acid
 - b) Hardening of oils
 - c) Production of synthetic rubber
 - d) Synthesis of methanol
15. A colloidal solution always has at least :
- a) One phase
 - b) More than two phases
 - c) A true solution
 - d) Two phases
16. Milk can be preserved by adding a few drops of :
- a) Formic acid solution
 - b) Formaldehyde solution
 - c) Acetic acid solution
 - d) Acetaldehyde solution
17. Addition of FeCl_3 to $\text{K}_4[\text{Fe}(\text{CN})_6]$ in dilute and cold solution gives :
- a) Prussian blue sol
 - b) $\text{Fe}_4[\text{Fe}(\text{CN})_6]_3$ sol
 - c) Positive sol
 - d) All of these
18. Colloidal solution commonly used in treatment of skin diseases is :
- a) Colloidal sulphur
 - b) Colloidal silver
 - c) Colloidal gold
 - d) Colloidal antimony
19. The substance that gets adsorbed on the surface of solid is called
- a) Adsorbate
 - b) Adsorbent
 - c) Micelle
 - d) Absorbent
20. Which of the following is not correct?
- a) Enthalpy of physical adsorption is less compared to enthalpy of chemical adsorption
 - b) Milk is an example of emulsion
 - c) Physical adsorption increases with the increase in temperature
 - d) Smoke is an aerosol
21. Which of the following characteristics is not correct for physical adsorption?
- a) Adsorption on solids is reversible
 - b) Adsorption increases with increase in temperature
 - c) Adsorption is spontaneous
 - d) Both enthalpy and entropy of adsorption are negative
22. Which of the following statements is incorrect?
- a) Physical adsorption occurs at very low temperature and chemisorptions occur at all temperature
 - b) The magnitude of chemisorption decreases with rise in temperature and physisorption increases with rise in temperature
 - c) Chemisorption is irreversible and physisorption is reversible
 - d) In physisorption, the activation energy of desorption is very low and in chemisorption, the activation energy of desorption is very high
23. Which of the following has maximum coagulation power with ferric hydroxide sol?
- a) Cryolite
 - b) $\text{K}_2\text{C}_2\text{O}_4$
 - c) $\text{K}_3[\text{Fe}(\text{CN})_6]$
 - d) $\text{K}_4[\text{Fe}(\text{CN})_6]$
24. The critical micelle concentration (CMC) is
- a) The concentration at which micellisation starts
 - b) The concentration at which the true solution is formed
 - c) The concentration at which one molar electrolyte is present per 1000 g of the solution
 - d) The concentration at which $\Delta H = 0$
25. A dilute solution of litmus becomes colourless on shaking with charcoal. This is due to :
- a) Absorption
 - b) Adsorption
 - c) Chemical reaction
 - d) Both (a) and (b)
26. Which of the following is an example for heterogeneous catalysis reaction?
- a) $2\text{SO}_2(g) + \text{O}_2(g) \xrightarrow{\text{NO}(g)} 2\text{SO}_3(g)$
 - b) Hydrolysis of aqueous sucrose solution in the presence of aqueous mineral acid

- c) $2\text{H}_2\text{O}_2(l) \xrightarrow{\text{pt(s)}} 2\text{H}_2\text{O}(l) + \text{O}_2(g)$
d) Hydrolysis of liquid in the presence of aqueous mineral acid
27. Which of the following is true in respect of adsorption?
a) $\Delta G < 0; \Delta S > 0; \Delta H < 0$ b) $\Delta G < 0; \Delta S < 0; \Delta H < 0$
c) $\Delta G > 0; \Delta S > 0; \Delta H < 0$ d) $\Delta G < 0; \Delta S < 0; \Delta H > 0$
28. Which is a homogeneous system?
a) A solution of sugar in water
b) Concrete
c) Muddy water
d) Bread
29. Which of the following is the most effective in the coagulation of gold sol?
a) NaNO_3 b) MgCl_2 c) Na_3PO_4 d) $\text{K}_4[\text{Fe}(\text{CN})_6]$
30. Which of the following is not a characteristic of chemisorption?
a) ΔH is the order of 400 kJ b) Adsorption is irreversible
c) Adsorption may be multimolecular layer d) Adsorption is specific
31. Select wrong statement.
a) If a very small amount of AlCl_3 is added to gold sol, coagulation occurs, but if a large quantity of AlCl_3 is added, there is no coagulation.
b) Organic ions are more strongly adsorbed on charged surfaces in comparison to inorganic ions.
c) Both emulsifier and peptising agents stabilise colloids but their actions are different.
d) Colloidal solutions are thermodynamically stable.
32. The size of colloidal particles is in between
a) $10^{-7} - 10^{-9} \text{ cm}$ b) $10^{-9} - 10^{-11} \text{ cm}$ c) $10^{-5} - 10^{-7} \text{ cm}$ d) $10^{-2} - 10^{-3} \text{ cm}$
33. The Brownian movement occurs in :
a) Colloidal solution
b) True solution
c) Suspension having size $< 500 \text{ m}\mu$
d) All of the above
34. Dyeing of fibre involves the process of :
a) Adsorption b) Absorption c) Sorption d) All of these
35. Which adsorption takes place at low temperature?
a) Physical b) Chemical c) Both (a) and (b) d) None of these
36. Term catalyst was given by
a) Rutherford b) Berzelius c) Wohler d) Kolbe
37. The Cottrell's precipitator is used to :
a) Neutralize charge on carbon particles in air in smoke
b) Coagulate carbon atoms of smoke
c) Bring in cataphoresis in carbon particles
d) All of the above
38. A catalyst is a substance which
a) Is always in the same phase as in the reactions
b) Alters the equilibrium in a reaction
c) Does not participate in the reaction but alters the rate of reaction
d) Participates in the reaction and provide an easier pathway for the same
39. Multimolecular colloids are present in
a) Soap solution b) Sol of proteins c) Sol of gold d) All of these
40. The rate of a certain biochemical reaction catalysed by an enzyme in human body is 10^4 times faster than when it carried out in the laboratory. The activation energy of this reaction :
a) Is zero

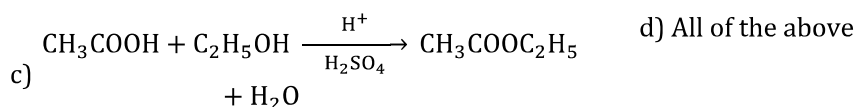
- b) Is different in two cases
c) Is the same in both the cases
d) None of the above
41. At CMC (critical micelle concentration), the surfactant molecules undergo
a) Dissociation b) Micelle formation c) Both (a) and (b) d) None of these
42. Activated charcoal is used to remove colouring matter from pure substances. It works by
a) Oxidation b) Reduction c) Bleaching d) Adsorption
43. Lyophobic colloids are :
a) Reversible colloids b) Irreversible colloids c) Protective colloids d) Gum, proteins
44. The size of the colloid particles is :
a) > suspension particles
b) < suspension particles
c) < true solution particles
d) None of these
45. Emulsions can be destroyed by
a) The addition of an emulsifier which tend to form an emulsion of the same type
b) Freezing
c) Both (a) and (b)
d) None of the above
46. Which characteristic of adsorption is wrong?
a) Physical adsorption in general decreases with temperature
b) Physical adsorption in general increases with temperature
c) Physical adsorption is a reversible process
d) Adsorption is limited to the surface only
47. Gelatin is often used as an ingredient in the manufacture of ice-cream. The reason for this is :
a) To prevent the formation of a colloid
b) To stabilize the colloid and prevent crystal growth
c) To cause the mixture to solidify
d) To improve the flavour
48. Blood contains :
a) Positively charged particles
b) Negatively charged particles
c) Neutral particles
d) Negatively as well as positively charged particles
49. The curve showing the variation of pressure with temperature for a given amount of adsorption is called



- a) Adsorption isobar b) Adsorption isotherm c) Adsorption isostere d) Adsorption isochore
50. When white light is passed through a colloidal solution containing fine suspended particles of gold, then the scattered light seen in a direction different from that of the incident light is :
a) Yellow coloured b) Blue coloured c) Green coloured d) Red coloured
51. Emulsions of polyvinylacetate are used in :
a) Polishes b) Latex paints c) Fire works d) Rayons
52. Peptization denotes
a) Digestion of food b) Hydrolysis of proteins
c) Breaking and dispersion into colloidal state d) Precipitation of solid from colloidal dispersion

53. Which characteristic is the most important factor in giving rise to peculiar properties of colloids?
 a) Large size
 b) Small size
 c) High charge density
 d) High ratio of surface area to the volume
54. Alum helps in purifying water by :
 a) Forming Si complex with clay particles
 b) Sulphate part which combines with the dirt and removes it
 c) Aluminium which coagulates the mud particles
 d) Making mud water soluble
55. If the dispersed phase is a liquid and the dispersion medium is a solid, the colloid is known as :
 a) A sol b) An emulsion c) A gel d) A foam
56. In physical adsorption gas molecules are bound on the solid surface by
 a) Chemical forces b) Electrostatic forces c) Graphical forces d) Van der Waals' forces
57. On adding 1 mL solution of 10% NaCl to 10 mL gold solution in the presence of 0.25 g of starch, the coagulation is just prevented. Starch has the gold number equal to :
 a) 0.25 b) 2.5 c) 250 d) 0.025
58. Hardy-Schulze rule states that :
 a) Non-electrolytes have better coagulating action on colloids than electrolytes
 b) Sols are coagulated by effective ions whose charge is opposite to that of sol and the ions of higher charge are much more effective than the ions of lower charge
 c) Charge of the ions has no effect on the coagulation of a sol
 d) Sols are coagulated only by those ions whose charge is similar to that of the sol
59. In homogeneous catalytic reactions, the rate of reaction :
 a) Depends upon the concentration of catalyst
 b) Independent of the concentration of catalyst
 c) Depends upon the free energy change
 d) Depends upon physical state of the catalyst
60. Catalysts are generally used in finely divided state because
 a) It avoids wastage of catalyst
 b) We can see its reaction
 c) It has more surface
 d) It has no effect on reaction rate
61. Which among the following statements is false?
 a) Adsorption may be monolayered or multilayered
 b) Particle size of adsorbent will not effect the amount of adsorption
 c) Increase of pressure increases the amount of adsorption
 d) Increase of temperature may decrease the amount of adsorption
62. Which of the following processes does not involve a catalyst?
 a) Ostwald process b) Contact process c) Thermite process d) None of these
63. Whipped cream is an example of :
Dispersed phase Dispersion medium
 a) Liquid gas
 b) Gas liquid
 c) Liquid liquid
 d) Solid liquid
64. Alloy is an example of
 a) Gel b) Solidified emulsion c) Solid solution d) Sol
65. Which of the following statements is correct about Langmuir's adsorption isotherm?

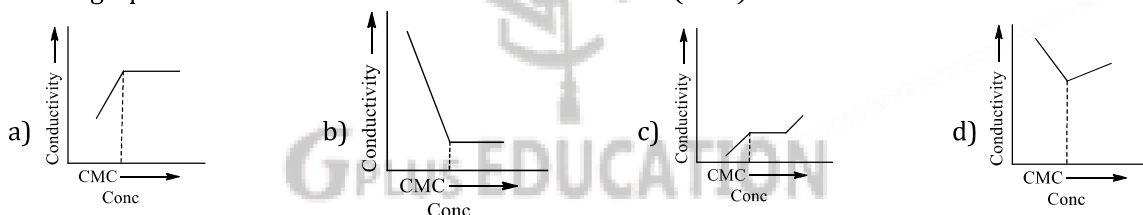
- a) It forms monolayer
c) It occurs at low temperature
- b) It is reversible in nature
d) None of the above
66. Zeolites :
a) Are microporous aluminosilicates
Have general formula
b) $M_{x/n}[(AlO_2)_x(SiO_2)_4] \cdot mH_2O$
c) Have pore sizes between 260 pm to 740 pm
d) All of the above
67. Which of the following does not contain hydrophobic structure?
a) Linseed oil b) Linolin c) Glycogen d) Rubber
68. An increase in the concentration of adsorbate at the surface relative to its concentration in bulk phase is called :
a) Adsorption b) Enthalpy c) Absorption d) None of these
69. Which will not form colloidal solution?
(Where DP = Dispersion phase and DM = Dispersion medium)
a) DP-gas, DM-liq. b) DP-liquid DM-solid c) DP-gas, DM-gas d) DP-solid, DM-solid
70. In Langmuir's model of adsorption of a gas on a solid surface
a) The rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered
b) The adsorption at a single site on the surface may involve multiple molecules at the same time
c) The mass of gas striking a given area of surface is proportional to the pressure of the gas
d) The mass of gas striking a given area of surface is independent of the pressure of the gas
71. The velocity of oxidation of oxalic acid by acidified $KMnO_4$ increase as the reaction progress. It is an example of
a) Promoters b) Catalytic poisons c) Autocatalysis d) Inhibitors
72. Which electrolyte is least effective in causing coagulation of +ve ferric hydroxide sol?
a) KBr b) K_2SO_4 c) K_2CrO_4 d) $K_2[Fe(CN)_6]$
73. A colloidal system in which gas bubbles are dispersed in a liquid is known as
a) Foam b) Aerosol c) Sol d) Emulsion
74. The false statement for hydrophilic sols is :
a) They do not require electrolytes for stability
b) Coagulation is reversible
c) Viscosity is of the order of that of water
d) Surface tension is lower than that of dispersion medium
75. When a catalyst is added to a system the:
a) Equilibrium concentrations are increased
b) Equilibrium concentrations are unchanged
c) The rate of forward reaction is increased and that of backward reaction is decreased
d) Value of equilibrium constant is decreased
76. The simplest way, to check whether a system is a colloid, is by
a) Tyndall effect b) Brownian movement
c) Electrodialysis d) Finding out particle size
77. Micelles have
a) Same colligative property as that of common colloidal solution
b) Lower colligative property as that of common colloidal solution
c) Higher colligative property as that of common colloidal solution
d) None of the above
78. Which of the following represent homogeneous catalysis?
a) $Oil + H_2 \xrightarrow{Ni} \text{saturated fat}$
b) $N_2(g) + 3H_2(g) \xrightarrow{Fe} 2NH_3(g)$



79. Detergent action of synthetic detergents is due to their :
 a) Interfacial area
 b) High molecular weight
 c) Ionisation
 d) Emulsifying properties
80. Ultramicroscope works on the principle of :
 a) Light reflection b) Light absorption c) Light scattering d) Light polarization
81. The catalyst iron, employed in the Haber's process, contains molybdenum, the function of which is :
 a) To increase the rate of combination of gases
 b) To counterbalance for the presence of impurities in the gases
 c) To act as a catalyst promoter and increase activity of catalyst
 d) To make up for the adverse temperature and pressure conditions
82. An emulsifier is a substance which
 a) Stabilises the emulsion b) Homogenises the emulsion
 c) Coagulates the emulsion d) Accelerates the dispersion of liquid in liquid
83. The example(s) of anionic surfactants is/are
 a) $\text{C}_{18}\text{H}_{37}\text{NH}_3\text{Cl}$ b) $\text{C}_{15}\text{H}_{31}\text{COONa}$ c) $\text{R} - \text{C}_6\text{H}_4 - \text{SO}_3\text{Na}$ d) $\text{C}_6\text{H}_{33}\text{N}(\text{CH}_3)_3\text{Cl}$
84. For adsorption of a gas on a solid, the plot of $\log \frac{x}{m}$ vs $\log p$ is linear with slope equal to (n being whole number)
 a) K b) $\log k$ c) n d) $\frac{1}{n}$
85. A substance which promotes the activity of a catalyst is known as :
 a) Initiator b) Catalyst c) Promoter d) Auto-catalyst
86. Adsorption of a gas on solid metal surface is spontaneous and exothermic, then :
 a) H increases b) S increases c) G increases d) S decreases
87. Freundlich adsorption isotherm is
 a) $\frac{x}{m} = kp^{1/n}$ b) $x = mkp^{1/n}$ c) $x/m = kp^{-n}$ d) All of these
88. Which of the following forms cationic micelles above certain concentration?
 a) Urea b) Sodium dodecyl sulphate
 c) Sodium acetate d) Cetyltrimethylammonium bromide
89. Catalyst in a reaction
 a) Lowers the activation energy b) Increase the rate of reaction
 c) Both (a) and (b) d) Initiates the reaction
90. The average size of the colloids is of the order :
 a) 10^{-12} m to 10^{-19} m b) 10^{-7} m to 10^{-9} m c) 10^{-9} m to 10^{-12} m d) 10^{-6} m to 10^{-9} m
91. If (x/m) is the mass of adsorbate adsorbed per unit mass of adsorbent, p is the pressure of the adsorbate gas and a and b are constants, which of the following represents "Langmuir adsorption isotherm"?
 a) $\log \left(\frac{x}{m} \right) = \log \left(\frac{a}{b} \right) + \frac{1}{a} \log p$ b) $\frac{x}{m} = \frac{b}{a} + \frac{1}{ap}$
 c) $\frac{x}{m} = \frac{1 + bp}{ap}$ d) $\frac{1}{(x/m)} = \frac{b}{a} + \frac{1}{ap}$
92. Tanning of leather is :
 a) Colouring of leather by chemicals
 b) Drying process to make the leather hard
 c) Polishing of leather to make it look attractive

- d) Coagulative hardening of the leather by chemicals
93. In a chemical reaction, catalyst
- Decrease the energy of activation
 - Increases the energy of activation
 - Does not change energy of activation
 - None of the above
94. Which one of the following methods is commonly used for destruction of colloid?
- Dialysis
 - Condensation
 - Filtration by animal membrane
 - By adding electrolyte
95. In multimolecular colloidal solutions, atoms or molecules are held together by :
- H-bonding
 - van der waals' forces
 - Ionic bonding
 - Covalent bonding
96. In autocatalysis
- Reactant act as catalyst
 - One of the product acts as catalyst
 - Vessel acts as catalyst
 - All of the above are incorrect
97. One of the reasons for greater reactivity of finely divided platinum catalyst is that it has :
- Particles which are almost atomic in dimensions
 - Particle size which can spread easily through whole reactants
 - Much larger surface area
 - A physical state only in which it can react quickly
98. The potential difference between the fixed charged layer and the diffused layer having opposite charge is called :
- Zeta potential
 - Streaming potential
 - Dorn potential
 - Colloidal potential
99. The protecting power of lyophilic colloidal sol is expressed in terms of :
- Critical miscelle concentration
 - Oxidation number
 - Coagulation value
 - Gold number
100. Rate of physical adsorption increase with
- Decrease in surface area
 - Decrease in temperature
 - Decrease in pressure
 - Increase in temperature
101. Size of colloidal particles is in the range
- $0.05 \mu - 0.1 \mu$
 - $25 \mu - 30 \mu$
 - $0.1 \mu - 1 \mu$
 - $10 \mu - 20 \mu$
102. Brownian motion of sol particle is theproperty of sol :
- Electrical
 - Optical
 - Kinetic
 - Colligative
103. Which of the following statements is correct for Tyndall effect?
- Scattering and polarizing of light by small suspended particles is called Tyndall effect
 - Tyndall effect of colloidal particles is due to dispersion of light
 - Tyndall effect is due to refraction of light
 - Zig – zag motion of suspended particles
104. Which is an emulsion?
- Boot polish
 - Lipstic
 - Shampoo
 - All of these
105. The process which is catalysed by one of the products formed during the reaction is known as :
- Autocatalysis
 - Anticatalysis
 - Negative catalysis
 - Acid catalysis
106. Lyophilic sols are more stable than lyophobic sols because the particles
- Are positively charged
 - Are negatively charged
 - Are solvated
 - Repel each other
107. Which is the property of hydrophilic sols?
- High concentration of dispersed phase can be easily attained
 - Coagulation is reversible

- c) The charge on particles depends on the pH of the medium and it may be positive, negative
d) All of the above
108. Which is not a colloidal solution of a liquid in another liquid?
a) Photographic emulsions
b) Soap in water
c) Homogenised milk
d) Latex
109. Gold numbers is associated with
a) Electrophoresis b) Protective colloids c) Tyndall effects d) Isotonic solutions
110. Which of the following will be the most effective in the coagulation of $\text{Fe}(\text{OH})_3$ sol?
a) KCN b) BaCl_2 c) NaCl d) $\text{Mg}_3(\text{PO}_4)_2$
111. Which of the following statement(s) is/are true?
a) Gelatin molecules (hydrophilic sol) are attracted to water molecules by London forces and hydrogen bonding
b) In hydrophobia sols, there is a lack of attraction between the dispersed phase and the continuous phase
c) Hydrophobia sols are basically unstable
d) All of the above
112. Which can adsorb larger volume of hydrogen gas?
a) Colloidal solution of palladium
b) Finely divided nickel
c) Finely divide platinum
d) Colloidal $\text{Fe}(\text{OH})_3$
113. Which graph is correct for critical micelle concentration (CMC)?



114. A colloidion solution is one which contains :
a) Cellulose nitrate in a alcohol-ether
b) Cellulose in water
c) Sucrose in water
d) None of the above
115. Which explains the effect of a catalyst on the rate of reversible reaction?
a) It provides a new reaction pathway with a lower activation energy
b) It moves the equilibrium position to the right
c) It increases the kinetic energy of the reacting molecules
d) It decreases the rate of the reverse reaction
116. Solvent loving colloids are :
a) Lyophobic colloid b) Lyophilic colloid c) Hydrophobic colloid d) None of these
117. Pd can adsorb 900 times its volume of hydrogen. This is called :
a) Absorption b) Adsorption c) Occlusion d) Both (a) and (c)
118. Which of the following is a wrong statement for physisorption?
a) It is a reversible reaction b) Reaction requires an energy of activation
c) The value of adsorption enthalpy is low d) It generally occurs at a low temperature
119. The function of negative catalyst is :
a) To remove the active intermediate from the reaction
b) To terminate the chain reaction

- c) Both (a) and (b)
d) None of the above
120. A liquid which markedly scatters a beam of light (visible in dark room) but leaves no residue when passed through a filter paper is best described as :
a) A suspension b) Sol c) True solution d) None of these
121. Modern theory of heterogeneous catalysis is :
a) Intermediate compound formation theory
b) Adsorption theory
c) A combination of two theories, *i. e.*, intermediate compound formation and adsorption theory
d) None of the above
122. Which of the following acts as a catalyst?
a) Metals with variable valency b) Metals with non-variable valency
c) Non-metals with fixed valency d) Inert gases
123. Silver iodide is used for producing artificial rain because AgI :
a) Is easy to spray at high altitudes
b) Is easy to synthesize
c) Has crystal structure similar to ice
d) Is insoluble in water
124. Shape selective catalysts are so called because of
a) The shape of the catalyst
b) The specificity of the catalyst
c) The size of the pores of catalyst which can trap selective molecules only
d) Their use for only some selected reaction
125. Which one of the following is a property of physisorption?
a) None-specific nature b) High specificity c) Irreversibility d) All of these
126. Medicines are more effective if they are used in :
a) Colloidal state b) Solid state c) Solution state d) None of these
127. Catalyst used in Friedel-Craft's reaction is
a) Iron b) Finely divided nickel
c) V_2O_5 d) Anhydrous $AlCl_3$
128. Milk contains a protein that is very good for health. The protein is :
a) Caffeine b) Calciferol c) Keratin d) Casein
129. Which statement is not correct?
a) Physical adsorption is due to van der Waals' forces
b) Physical adsorption decreases at high temperature and low pressure
c) Physical adsorption is reversible
d) Adsorption energy for a chemical adsorption is generally lesser than that of physical adsorption
130. Identify the gas which is readily adsorbed by activated charcoal
a) N_2 b) SO_2 c) H_2 d) O_2
131. Which one of the following will have highest coagulating power for As_2S_3 colloid?
a) Al^{3+} b) PO_4^{3-} c) SO_4^{2-} d) Na^+
132. The separation of colloidal particles (or purification of sol) from particles of molecular dimensions is known as :
a) Photolysis b) Dialysis c) Pyrolysis d) Peptization
133. Dust storm is :
a) Dispersion of solid in gas
b) Dispersion of a gas in solid
c) Dispersion of solid in solid
d) Dispersion of a gas in liquid

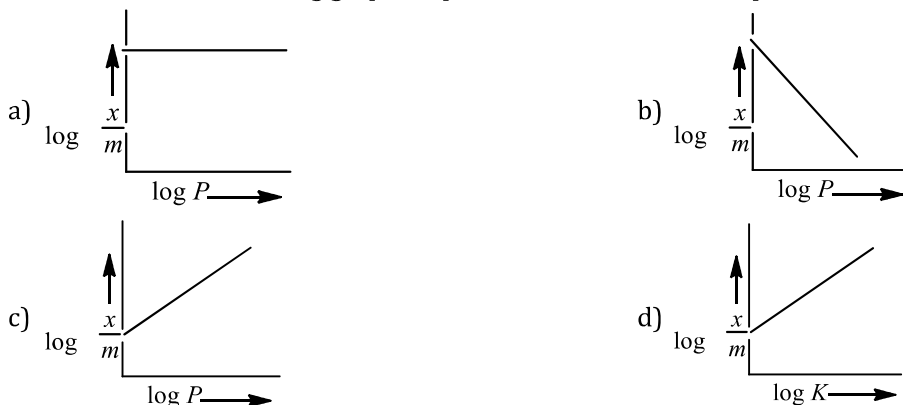
134. The catalyst used in the manufacture of nitric acid by Ostwald's process is :
 a) Mo b) Pt c) V_2O_5 d) Fe
135. Tyndall effect would be observed in
 a) Solvent b) Solution c) Colloidal solution d) Precipitate
136. Plot of $\log x/m$ against $\log p$ is a straight line inclined at an angle of 45° . 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) 1 g b) 2 g c) 3 g d) 5 g
137. On adding few drops of dil HCl to freshly precipitated ferric hydroxide, a red coloured solution is obtained. This phenomenon is known as
 a) Peptisation b) Dialysis c) Protective action d) Dissolution
138. At CMC, the surfactant molecules undergoes :
 a) Association b) Aggregation c) Micelle formation d) All of these
139. A biological catalyst is
 a) An amino acid b) A carbohydrate
 c) The nitrogen molecule d) An enzyme
140. An example of dispersion of a liquid in a gas is
 a) Milk b) Vegetable oil c) Foam d) Mist
141. Which of the following is not correct?
 a) Milk is a naturally occurring emulsion b) Gold sol is a lyophilic sol
 c) Physical adsorption decreases with rise in temperature d) Chemical adsorption is unilayered
142. In contact process of manufacture of H_2SO_4 , the catalyst used is
 a) Iron b) V_2O_5 c) Chromium d) Oxides of nitrogen
143. The catalyst used in the chamber process of sulphuric acid is :
 a) Platinum b) Nitric oxide c) Nickel d) Vanadium pentoxide
144. Isoelectric point refers to the H^+ ion concentration at which the colloidal particles :
 a) Coagulate
 b) Become electrically neutral
 c) Can move to either electrode when subjected to an electric field
 d) Reverse their electrical charge
145. The Langmuir adsorption isotherm is deduced using the assumption :
 a) The adsorption sites are equivalent in their ability to adsorb the particles
 b) The heat of adsorption varies with coverage
 c) The adsorbed molecules interact with each other
 d) The adsorption takes place in multilayers
146. Sedimentation potential is the reverse of
 a) Electroosmosis b) Electrophoresis
 c) Electrokinetic potential d) Dorn potential
147. During the adsorption of krypton on activated charcoal at low temperature
 a) $\Delta H > 0$ and $\Delta S < 0$ b) $\Delta H < 0$ and $\Delta S < 0$
 c) $\Delta H > 0$ and $\Delta S > 0$ d) $\Delta H < 0$ and $\Delta S > 0$
148. A catalyst in finely divided state is more efficient because in this state
 a) It has larger activation energy
 b) It can react with one of the reactants more efficiently
 c) It has large surface area
 d) All of the above
149. Cow milk, an example of natural emulsion is stabilised by
 a) Fat b) Water c) Casein d) Mg^{2+} ions

150. Identify the correct statements regarding enzymes.
- Enzymes are specific biological catalysts that can normally function at very high temperatures ($T \sim 1000\text{ K}$)
 - Enzymes are normally heterogeneous catalysts that are very specific in their action.
 - Enzyme are specific biological catalysts that cannot be poisoned
 - Enzyme are specific biological catalysts that possess well defined active sites
151. BaSO_4 acts asfor Pd in Rosenmund's reaction:
- Promoter
 - Poison
 - Autocatalyst
 - None of these
152. Which is not shown by sols?
- Adsorption
 - Tyndall effect
 - Flocculation
 - Paramagnetism
153. Bredig arc method cannot be used to prepare colloidal solution of :
- Pt
 - Fe
 - Ag
 - Au
154. The reaction between alkali and fat is called :
- Saponification
 - Hydrolysis
 - Distillation
 - dehydration
155. A colloidal system involves :
- A state of dissolution
 - A state of dispersion
 - A state of suspension
 - None of these
156. Conversion of milk into curd is made by the enzyme :
- Diastase
 - Invertase
 - Micoderma bacilli
 - Lactic bacilli
157. Identify the gas which is readily adsorbed by activated charcoal
- H_2
 - N_2
 - SO_2
 - O_2
158. Which is not correct for heterogeneous catalysis?
- The catalyst decreases the energy of activation
 - The surface of catalyst plays an important role
 - The catalyst actually forms a compound with reactants
 - There is no change in the energy of activation
159. The phenomenon observed when a beam of light is passed through a colloidal solution is
- Cataphoresis
 - Delectrophoresis
 - Coagulation
 - Tyndall effect
160. Isoelectric point is the pH at which colloidal particles
- Become electrically charged
 - Can move towards respective electrodes
 - Coagulate
 - None of the above
161. In homogeneous catalysis
- The reactant, catalyst and products are in the same phase
 - The catalyst and reactants are in the same phase
 - The catalyst and products are in the same phase
 - The reactants and products are in the same phase
162. The enzyme which can catalyse the conversion of glucose of ethanol is :
- Zymase
 - Invertase
 - Maltase
 - diastase
163. The addition of alcohol to a saturated aqueous solution of calcium acetate first forms a sol and then sets to a gelatinous mass called solid alcohol which is a :
- Solid sol
 - Aerosol
 - Solid form
 - gel
164. Colloidal solution commonly used in treatment of eye disease is :
- Colloidal sulphur
 - Colloidal silver
 - Colloidal gold
 - Colloidal antimony
165. In Zeigler-Natta polymerisation of ethylene, the active species is :
- AlCl_3
 - Et_3Al
 - CH_2CH_2
 - Ti^{III}
166. If liquid is dispersed in solid medium, this is called
- Sol
 - Emulsion
 - Liquid aerosol
 - gel
167. In which of these processes platinum is used as a catalyst?
- Oxidation of ammonia to form HNO_3
 - Hardening of oils
 - Protection of synthetic rubber
 - Synthesis of methanol

168. Which is the characteristic of catalyst?

- a) It changes equilibrium point
- b) It initiates the reaction
- c) It alters the rate of reaction
- d) It increases average KE of molecules

169. Which one of the following graphs represents Freundlich adsorption isotherm?



170. ZSM-5 is used to convert :

- a) Alcohol to petrol
- b) Benzene to toluene
- c) Toluene to benzene
- d) Heptane to toluene

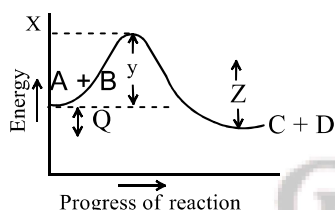
171. Which acts as inhibitor for knocking in combustion of petrol?

- a) $(C_2H_5)_4 Pb$
- b) $Ni(CO)_4$
- c) Both (a) and (b)
- d) None of these

172. Which of the following electrolytes is least effective in coagulation ferric hydroxide solution?

- a) KBr
- b) K_2SO_4
- c) K_2CrO_4
- d) $K_4[Fe(CN)_6]$

173. Mark the correct statement about given graph :



- a) X is threshold energy level
- b) Y and Z are energy of activation for forward and backward reaction respectively.
- c) Q is heat of reaction and reaction is exothermic
- d) All of the above

174. From the following which is not an emulsifier?

- a) Agar
- b) Milk
- c) Gum
- d) Soap

175. According to Langmuir adsorption isotherm the amount of gas adsorbed at very high pressure :

- a) Reaches a constant limiting value
- b) Goes on increasing with pressure
- c) Goes on decreasing with pressure
- d) Increases first and decreases later with pressure

176. The enzyme ptyalin used for digestion of food is present in :

- a) Saliva
- b) Blood
- c) Intestine
- d) Adrenal glands

177. Flocculation value is expressed in terms of :

- a) Millimole per litre
- b) Mole per litre
- c) Gram per litre
- d) Mole per millilitre

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

- a) Heterogeneous catalysis
- b) Homogeneous catalysis
- c) Enzyme catalysis
- d) Non-catalytic process

179. Identify the correct statement for the adsorption of a real gas on charcoal at 1 atm and $15^\circ C$

- a) Gases which are small in molecular size are adsorbed more
- b) Decrease in pressure increases the extent of adsorption

- c) Gases which are easily liquefiable are adsorbed more in quantity
d) Gas which has a behaviour similar to an inert gas is adsorbed more
180. Which statement about enzymes is not correct?
a) Enzymes are in colloidal state
b) Enzymes are catalysts
c) Enzymes can catalyse any reaction
d) Urease is an enzyme
181. Gold number is the index for :
a) Protective power of lyophilic colloid
b) Purity of gold
c) Metallic gold
d) Electroplated gold
182. Emulsions are normally prepared by shaking vigorously the two components together with same kind of emulsifying agent to stabilize the product. The emulsifying agent may be
a) Soap b) Surfactant c) Lyophilic solution d) All of these
183. Choose the incorrect statement
a) Non-ionic surfactant molecules cluster together in clumps
b) Ionic surfactants tend to disrupt by electrostatic repulsions between head groups
c) Micelles look like flattened spherical structure at CMC
d) None of the above
184. The cementation process is :
a) Gel formation b) Emulsion formation c) Either of them d) None of them
185. In which of the following, Tyndall effect is not observed?
a) Smoke b) Emulsion c) Sugar solution d) Gold sol
186. Enzymes are
a) Microorganism b) Proteins
c) Inorganic compounds d) Moulds
187. Adsorption is multilayer in the case of
a) Physical adsorption b) Chemisorption c) Both (a) and (b) d) None of these
188. There is formation of an electrical double layer of opposite charges on the surface of colloidal particles, so a potential develops which is known as
a) Electrokinetic potential b) Zeta potential
c) Streaming potential d) Colloidal potential
189. Which of the following is wrong?
a) A catalyst remain unchanged at the end of chemical reaction
b) A catalyst is specific in action
c) A catalyst does not changes the state of equilibrium in a chemical reaction
d) A catalyst can start a reaction
190. Which requires catalyst :
a) $S + O_2 \rightarrow SO_2$ b) $2SO_2 + O_2 \rightarrow 2SO_3$ c) $C + O_2 \rightarrow CO_2$ d) All of these
191. Which of the following impurities present in colloidal solution cannot be removed by electrodialysis?
a) Sodium chloride b) Potassium sulphate c) Urea d) Calcium chloride
192. The minimum energy level necessary to permit a reaction to occur is :
a) Internal energy b) Threshold energy c) Activation energy d) Free energy
193. The movement of sol particles under an applied electric field is called :
a) Electrodeposition b) Electrodialysis c) Electroosmosis d) Electrophoresis
194. The arsenious sulphide sol has negative charge. The maximum coagulating power for precipitating it is of :
a) 0.1 N $Zn(NO_3)_2$ b) 0.1 N Na_3PO_4 c) 0.1 N $ZnSO_4$ d) 0.1 N $AlCl_3$
195. Among the electrolytes Na_2SO_4 , $CaCl_2$, $Al_2(SO_4)_3$ and NH_4Cl , the most effective coagulation agent for Sb_2S_3

sol is

- a) Na_2SO_4 b) CaCl_2 c) $\text{Al}_2(\text{SO}_4)_3$ d) NH_4Cl

196. An example of solid-solid system is :

- a) Smoke b) Cake c) Synthetic gems d) Pumice stone

197. The volume of a colloidal particle, V_c as compared to the volume of a solute particle in a true solution V_s , could be

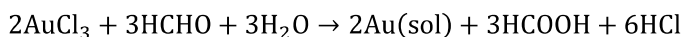
- a) $\frac{V_c}{V_s} \approx 10^3$ b) $\frac{V_c}{V_s} \approx 10^{-3}$ c) $\frac{V_c}{V_s} \approx 10^{23}$ d) $\frac{V_c}{V_s} \approx 1$

198. The volume of colloidal particles V_c as compared to the volume of solute particles in true solution V_s could be :

- a) ~ 1 b) $\sim 10^3$ c) $\sim 10^2$ d) $\sim 10^{-3}$

199. Mention the type of reaction to obtain $\text{Au}(\text{sol})$.

Reaction,



- a) Hydrolysis b) Oxidation
c) Reduction d) Double decomposition

200. On addition of 1mL solution of 10% NaCl to 10mL gold solution in the presence of 0.025 g of starch, the coagulation is prevented because starch has the following gold numbers

- a) 25 b) 0.025 c) 0.25 d) 2.5

201. The movement of colloidal particles towards their respective electrodes in the presence of an electric field is known as

- a) Electrolysis b) Brownian movement
c) Dialysis d) Electrophoresis

202. Lyophilic sols are

- a) Irreversible sols b) They are prepared from inorganic compounds
c) Coagulated by adding electrolytes d) Self-stabilising

203. Clouds, mist, fog and aerosols are colloidal solutions of :

- a) Solid in a gas b) Gas in a solid c) Liquid in a gas d) Gas in a liquid

204. Protons accelerate the hydrolysis of esters. This is an example of :

- a) A heterogeneous catalysis
b) An acid-base catalysis
c) A promoter
d) A negative catalyst

205. 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 :

- a) A promoter b) A positive catalyst c) An autocatalyst d) None of these

206. In Freundlich Adsorption isotherm, the value of $1/n$ is :

- a) 1 in case of physical adsorption
b) 1 in case of chemisorption
c) Between 0 and 1 in all cases
d) Between 2 and 4 in all cases

207. Purple of cassius is

- a) Colloidal solution of Au
b) Colloidal solution of Pt
c) Colloidal solution of Ag
d) Colloidal solution of As

208. Freundlich equation for adsorption of gases (in amount of X g) on a solid (in amount of m g) at constant temperature can be expressed as

- a) $\log \frac{X}{m} = \log p + \frac{1}{n} \log k$ b) $\log \frac{X}{m} = \log k + \frac{1}{n} \log p$

$$\text{d) } \frac{X}{m} = \log p + \frac{1}{n} \log k$$

224. Colloidal sol is :
 a) True solution b) Suspension c) Heterogeneous sol d) Homogeneous sol
225. The blue colour of the water of the sea is due to :
 a) Refraction of the blue light by the impurities in sea water
 b) Reflection of blue light by sea water
 c) Scattering of blue light by sol particles
 d) Absorption of other colours except the blue colour by water molecules
226. The spontaneous outcome of internal liquid from gels is called :
 a) Syneresis b) Thixotropy c) Swelling d) None of these
227. Solid aerosol is an example of colloidal system of :
 a) Liquid dispersed in gas
 b) Gas dispersed in gas
 c) Solid dispersed in gas
 d) Solid dispersed in liquid
228. Which is more powerful to coagulate the negative colloid?
 a) ZnSO_4 b) Na_3PO_4 c) AlCl_3 d) $\text{K}_4[\text{Fe}(\text{CN})_6]$
229. Which is used as catalyst to retard the oxidation of chloroform?
 a) H_2O b) $\text{C}_2\text{H}_5\text{OH}$ c) Glycerol d) H_2SO_4
230. Micelle is a term used for the aggregates formed in solution by
 a) Colloidal electrolyte b) Colloidal non-electrolyte
 c) Non associated colloids d) None of the above
231. Which reaction characteristics are changing by the addition of a catalyst to a reaction at constant temperature?
 (i)activation energy (ii)Equilibrium constant (iii)Reaction entropy (iv)Reaction enthalpy
 a) (i) only b) (iii) only c) (i) and (ii) only d) All of these
232. The colour of sky is due to
 a) Transmission of light b) Wavelength of scattered light
 c) Adsorption of light by atmospheric gases d) All of the above
233. Egg albumin is :
 a) Reversible colloid b) Lyophilic colloid c) Protective colloid d) All of these
234. How many layers are adsorbed in chemical adsorption?
 a) One b) Two c) Many d) Zero
235. Blood may be purified by
 a) Dialysis b) Electro-osmosis c) Coagulation d) Filtration
236. Who coined the term catalysis and awarded Nobel Prize?
 a) Berzelius b) Kolbe c) Wholer d) Rutherford
237. The sky looks blue due to
 a) Dispersion effect b) Reflection effect c) Transmission effect d) Scattering effect
238. Fermentation of starch to give alcohol takes place in presence of :
 a) Enzymes b) CO_2 c) Air d) N_2
239. Efficiency of catalyst depends on
 a) Concentration b) Molecular mass c) Size of particles d) None of these
240. The amount of gas adsorbed physically on charcoal increases with :
 a) Temperature and pressure
 b) Temperature and decreases with pressure
 c) Pressure and decreases with temperature
 d) None of the above
241. Which statement is wrong?
 a) The catalyst does not alter the equilibrium of a reaction

- b) Reaction with higher activation energy has higher rate constant
 c) In the endothermic reaction, the activation energy of the reaction is higher than that of heat of reaction
 d) Half-life period of a first order reactions is independent of initial concentration
242. During hydrogenation of oils, catalyst commonly used is :
 a) Pd or CuCl_2 b) Finely divided Ni c) Fe d) V_2O_5
243. Which of the following reactions is an example of heterogeneous catalysis?
 a) $\text{O}_3 + \text{O} \xrightarrow{\text{Cl}} 2\text{O}_2$ (gas phase)
 b) $2\text{CO}(g) + \text{O}_2(g) \xrightarrow{\text{NO}} 2\text{CO}_2(g)$
 c)
$$\begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{C} - \text{OC}_2\text{H}_5 (l) + \text{H}_2\text{O} (l) \end{array} \xrightarrow{\text{H}_2\text{SO}_4} \begin{array}{c} \text{O} \\ || \\ \text{CH}_3 - \text{C} - \text{OH} (l) + \text{C}_2\text{H}_5\text{OH} (l) \end{array}$$

 d) $\text{CO}(g) + 2\text{H}_2(g) \xrightarrow{\text{Cu, ZnO} - \text{Cr}_2\text{O}_3} \text{CH}_3\text{OH}(l)$
244. Which is not a macromolecule?
 a) Palmitate b) Starch c) DNA d) Insulin
245. Physical adsorption increases when
 a) Temperature increases b) Temperature decreases
 c) Temperature remains constant d) Temperature increases above 60°C
246. Soap removes grease by :
 a) Adsorption b) Emulsification c) Coagulation d) None of these
247. Which of the following is correct according to adsorption isotherm?
 a) $\frac{x}{m} \propto p^0$ b) $\frac{x}{m} \propto p^1$ c) $\frac{x}{m} \propto p^{1/n}$ d) All of these
248. Which of the following statements is incorrect regarding physisorptions?
 a) It occurs because of van der Waals' forces
 b) More easily liquefiable gases are adsorbed readily
 c) Under high pressure it results into multimolecular layer on adsorbent surface
 d) Enthalpy of adsorption ($\Delta H_{\text{adsorption}}$) is slow and positive
249. In which process, a catalyst is not used?
 a) Deacon's process b) Solvay's process c) Chamber process d) Haber's process
250. Hydrolysis of urea is an example of
 a) Homogeneous catalysis b) Heterogeneous catalysis
 c) Biochemical catalysis d) Zeolite catalysis
251. Which of the following is a heterogeneous catalysis?
 a) $2\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Conc H}_2\text{SO}_4} \text{C}_2\text{H}_5\text{OC}_2\text{H}_5 + \text{H}_2\text{O}$ b) $2\text{CO} + \text{O}_2 \xrightarrow{\text{NO}} \text{CO}_2$
 c) $\text{SO}_2 + \frac{1}{2}\text{O}_2 \xrightarrow{\text{NO}_2} \text{SO}_3$ d) $\text{SO}_2 + \frac{1}{2}\text{O}_2 \xrightarrow{\text{V}_2\text{O}_5} \text{SO}_3$
252. Milk is
 a) Fat dispersed in water b) Fat dispersed in milk
 c) Fat dispersed in fat d) Water dispersed in milk
253. Which of the following is the best protective colloid?
 a) Gelatin (Gold no.=0.005) b) Gum Arabic (Gold no. =0.15)
 c) Egg albumin (Gold no.=0.08) d) None of the above
254. Which of the following reactions lead to the formation of colloidal solution?
 a) $\text{Cu} + \text{HgCl}_2 \rightarrow \text{CuCl}_2 + \text{Hg}$ b) $2\text{HNO}_3 + 3\text{H}_2\text{S} \rightarrow 3\text{S} + \text{H}_2\text{O} + 2\text{NO}$
 c) $2\text{Mg} + \text{CO}_2 \rightarrow 2\text{MgO} + \text{C}$ d) $\text{Cu} + \text{CuCl}_2 \rightarrow 2\text{CuCl}$

255. The coagulation of sol particles or sol destruction may be brought in by :
- Cataphoresis
 - Adding oppositely charged sol
 - Adding electrolyte
 - All of the above
256. Which is an example of a heterogeneous catalysis?
- Formation of SO_3 in the chamber process
 - Formation of SO_3 in the contact process
 - Hydrolysis of an ester in the presence of H^+ ions
 - Combination of H_2 and Cl_2 in the presence of moisture
257. A negatively charged suspension of clay in water needs for precipitation the minimum amount of :
- Aluminium chloride
 - Potassium sulphate
 - Sodium hydroxide
 - Hydrochloric acid
258. The Brownian motion is due to:
- Temperature fluctuations within the liquid phase
 - Attraction and repulsion between charges on the colloidal particles
 - Impact of the molecules of the dispersion medium on the colloidal particles
 - Convective currents
259. What will be the Freundlich adsorption isotherm equation at high pressure?
- $\frac{x}{m} = k$
 - $\frac{x}{m} = kp^{1/n}$
 - $\frac{x}{m} = kp$
 - None of these
260. An example for autocatalysis is
- Oxidation of NO to NO_2
 - Oxidation of SO_2 to SO_3
 - Decomposition of KClO_3 to KCl and O_2
 - Oxidation of oxalic acid by acidified KMnO_4
261. The action of enzymes in living system is to
- Supply energy to tissues
 - Create immunity
 - Circulate oxygen
 - Enhance the rate of biochemical reactions
262. According to the adsorption theory of catalysis, the speed of the reaction increases because
- The concentration of reactant molecules at the active centres of the catalyst becomes high due to adsorption
 - In the process of adsorption, the activation energy of the molecules becomes large
 - Adsorption produces heat which increases the speed of the reaction
 - Adsorption lowers the activation energy of the reaction
263. A catalyst :
- Alter the reaction mechanism
 - Decreases the activation energy
 - Increases collision frequency
 - Increases the average kinetic energy of reacting species
264. The addition of 1% alcohol to chloroform acts as
- Auto-catalyst
 - Bio-catalyst
 - Positive catalyst
 - Negative catalyst
265. Which of the following does not form anionic micelle?
- $\text{C}_{12}\text{H}_{25}\text{COONa}$
 - $\text{C}_{12}\text{H}_{25}\text{SO}_4\text{Na}$
 - $\text{C}_{12}\text{H}_{25}\text{SO}_3\text{Na}$
 - $\text{C}_{12}\text{H}_{25}(\text{NH}_3)_3\text{Cl}$
266. Which of the following is not a method of preparation of colloidal solution?
- Electrical dispersion
 - Peptization
 - Coagulation
 - Mechanical dispersion
267. The density of gold is 19 g/cm^3 . If $1.9 \times 10^{-4} \text{ g}$ of gold is dispersed in 1 L of water to give a sol having spherical gold particles of radius 10 nm, then the number of gold particles per mm^3 of the sol will be
- 1.9×10^{12}
 - 6.3×10^{14}
 - 6.3×10^{10}
 - 2.4×10^6
268. According to Freundlich adsorption isotherm, which of the following is correct?
- $\frac{x}{m} \propto p^1$
 - $\frac{x}{m} \propto p^{1/n}$

c) $\frac{x}{m} \propto p^0$

d) All of the above are correct for different ranges of pressure

269. Catalytic poisoners are usually the same as :

- a) Poison for human body
- b) Enzyme for human body
- c) Vitamins for human body
- d) None of the above

270. The reactions in which catalyst and reactant have one phase are known as :

- a) Gaseous reactions
- b) Homogeneous catalytic reactions
- c) Heterogeneous catalytic reactions
- d) None of the above

271. Mutarotation of glucose is an example of :

- a) Acid-base catalysis
- b) Homogeneous catalysis
- c) Both (a) and (b)
- d) None of these

272. Air can oxidize sodium sulphite in aqueous solution but cannot do so in the case of sodium arsenite. If however, air is passed through a solution containing both sodium sulphite and sodium arsenite then both are oxidized. This is an example of :

- a) Positive catalysis
- b) Negative catalysis
- c) Induced catalysis
- d) Autocatalysis

273. Which statement is not correct?

- a) All the soaps are detergents
- b) Detergents possess cleansing action in addition to surface activity
- c) All the surfactants are detergents
- d) Surfactants possess surface activity

274. Which of the following is mismatched?

Dispersed Phase	Dispersed medium	Specific name			
a) Liquid	liquid	emulsion	b) Solid	solid	solid sol
c) Liquid	gas	aerosol	d) Gas	solid	foam

275. Gold number of few colloids are given below,

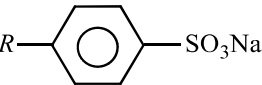
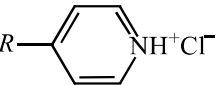
Gelatin = 0.005 Starch = 25
Egg albumin = 0.08 Gum Arabic = 0.10
Which is best protective colloid?

- a) Gelatin
- b) Starch
- c) Egg albumin
- d) Gum arabic

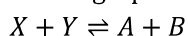
276. Which gas is adsorbed strongly by charcoal?

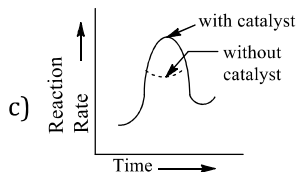
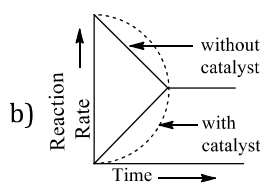
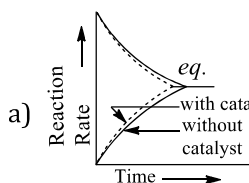
- a) CO
- b) N₂
- c) H₂
- d) NH₃

277. Non-electrolyte colloidal surfactants is :

- a) C₁₇H₃₅COONa
- b) 
- c) C_nH_{2n+1}(OCH₂CH₂)_xOH
- d) 

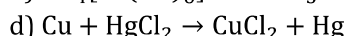
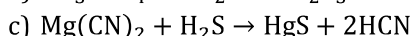
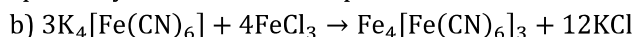
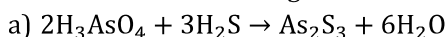
278. Which graph is correctly represented the action of catalysts?





d) All of these

279. In which of the following reactions colloids are not prepared by the double decomposition method?



280. Which statement is wrong?

a) Haber's process of NH_3 requires iron as catalyst

b) Friedel-Crafts reaction requires anhydrous AlCl_3

c) Hydrogenation of oils requires iron as catalyst

d) Oxidation of SO_2 to SO_3 requires V_2O_5

281. Which of the following cannot form the micelles?

a) Sodium benzoate

b) Sodium lauryl sulphate

c) Sodium alkyl benzene sulphonate

d) Sodium oleate

282. Which is an emulsifier?

a) Soap

b) Oil

c) NaCl

d) Water

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

a) Pb^{2+}

b) Pb^{4+}

c) Sr^{2+}

d) Na^+

284. Which is not lyophilic colloid?

a) Milk

b) Gum

c) Fog

d) blood

285. Which is not correct?

a) Every solid substance can be brought in colloidal state

b) Every solid substance can be made to behave like a lyophobic colloid

c) Addition of electrolytes coagulates the sol

d) Colloidal particles carry charges

286. Which of the following types of catalysis can be explained by the adsorption theory?

a) Homogeneous catalysis

b) Acid-Base catalysis

c) Heterogeneous catalysis

d) Enzyme catalysis

287. Which type of metals form effective catalysts?

a) Alkali metals

b) Transition metals

c) Alkaline earth metals

d) Radioactive metals

288. Milk is an example of which of the following?

a) True solution

b) Gel

c) Suspension

d) Emulsion

289. The decomposition of H_2O_2 may be checked by adding a small quantity of phosphoric acid. This is an example of:

a) Neutralization

b) Negative catalysis

c) Positive catalysis

d) Catalytic poisoning

290. Zeolites are:

a) Water softener

b) Catalyst

c) Both (a) and (b)

d) None of these

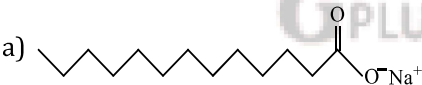
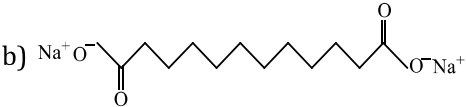
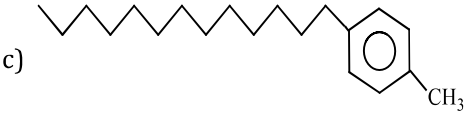
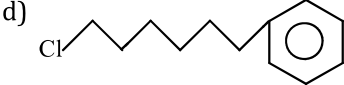
291. Which one of the following is a lyophilic colloidal solution?

a) Smoke

b) Gold sol

- c) Starch aqueous solution d) Cloud
292. In temporary poisoning, catalytic poisons act by :
- Coagulating the catalyst
 - Chemically combining with any one of the reactants
 - Chemically combining with the catalyst
 - Getting physically adsorbed on the active centres of the catalyst
293. If x is amount of adsorbate and m is amount of adsorbent, which of the following relations is related to adsorption process?
- $\frac{x}{m} = P \times T$
 - $x/m = f(P)$ at constant T
 - $x/m = f(T)$ at constant P
 - $P = f(T)$ at constant (x/m)
294. Which is adsorbed into maximum amount by activated charcoal?
- N_2
 - CO_2
 - Cl_2
 - O_2
295. Fog is a colloidal solution of
- Solid in gas
 - Liquid in gas
 - Gas in liquid
 - Gas in solid
296. A catalyst is a substance which :
- Increases equilibrium constant of reaction
 - Changes the equilibrium conc. of reaction
 - Shortens the time to reach equilibrium
 - Supplies the energy of the reaction
297. Ferric chloride is applied to stop bleeding because
- Fe^{3+} ions coagulate negatively charged blood solution
 - Fe^{3+} ions coagulate positively charged blood solution
 - Cl^- ions coagulate positively charged blood solution
 - Cl^- ions coagulate negatively charged blood solution
298. The formation of colloid from suspension is
- Peptisation
 - Condensation
 - Sedimentation
 - Fragmentation
299. Which is not a colloidal solution of gas in liquid?
- Froths
 - Foams with tiny bubbles
 - Mist
 - Whipped cream
300. In chemical reaction, catalyst
- Alters the amount of the products
 - Lowers the activation energy
 - Decreases the ΔH of forward reaction
 - Increases the ΔH of forward reaction
301. Which equation represents Freundlich adsorption isotherm (physical adsorption is basis of this theory)?
- $\frac{x}{m} = K(P)^{1/n}$ where x is amount of gas adsorbed on mass ' m ' at pressure P
 - $\log \frac{x}{m} = \log K + \frac{1}{n} \log P$
 - $\frac{x}{m} = KP$ at low pressure and $\frac{x}{m} = K$ at high pressure
 - All of the above
302. The catalyst used in the contact process of sulphuric acid is :
- Copper
 - Iron
 - Vanadium pentoxide or Pt (asbestos)
 - Ni
303. When adsorption of oxalic acid is carried out on activated charcoal, the activated charcoal is known as

- a) Adsorbate b) Adsorbent c) Adsorber d) All of these
304. The basic principal of cottrell's precipitator is
 a) Le-Chatelier's principle b) Peptisation
 c) Neutralisation of charge on colloidal particles d) Scattering of light
305. The equation for Freundlich adsorption isotherm is
 a) $\frac{x}{m} = kp^{1/n}$ b) $x = mkp^{1/n}$ c) $x/m = kp^{-n}$ d) All of these
306. Butter is a colloid form in which :
 a) Fat is dispersed in solid casein
 b) Fat globules are dispersed in water
 c) Water is dispersed in fat
 d) Suspension of casein is in water
307. Peptization involves
 a) Precipitation of colloidal particles
 b) Disintegration of colloidal aggregates
 c) Evaporation of dispersion medium
 d) Impact of molecules of the dispersion medium on the colloidal particles
308. In negative catalysis
 a) The speed of chemical reaction slows down
 b) Speed of the chemical reaction remain the same
 c) Speed of the chemical reaction increases
 d) None of the above
309. Gold number :
 a) May be defined as the milligram of the dry material of which the hydrophilic sol is prepared and which when added to 10 mL of red gold sol, will prevent it from coagulation on the addition of 1 mL of 10 per cent sodium chloride solution
 b) May be defined as the milligram of the dry material of which the hydrophilic sol is prepared and which when added to 1 mL of red gold sol will prevent it from coagulation on the addition of 10 mL of 10 per cent sodium chloride solution
 c) May be defined as the milligram of the dry material of which the hydrophilic sol is prepared and which when added to 1 mL of red gold sol will prevent it from coagulation on the addition of 1 mL of 1 per cent sodium chloride solution
 d) None of the above
310. Which of the following is not a property of colloidal solution?
 a) Heterogeneity b) Particle size $> 100 \text{ nm}$
 c) Tyndall effect d) Brownian movement
311. Lyophilic sols are more stable than lyophobic sols because :
 a) The colloidal particles have positive charge
 b) The colloidal particles have no charge
 c) The colloidal particles are solvated
 d) There are strong electrostatic repulsions between the negatively charged colloidal particles
312. On adding 1 mL of solution of 10% NaCl to 10mL of gold sol in the presence of 0.25g of starch, the coagulation is just prevented. The gold number of starch is
 a) 0.25 b) 0.025 c) 2.5 d) 250
313. Associated colloid among the following is
 a) Enzyme b) Proteins c) Cellulose d) Sodium stearate
314. KClO_3 on heating decomposes into KCl and O_2 . If some MnO_2 is added the reaction goes much faster because :
 a) MnO_2 decomposes to give oxygen
 b) MnO_2 provides heat by reacting

- c) Better contact is provided by MnO_2
 d) MnO_2 acts as a catalyst
315. Which of the following is incorrect for electrophoresis?
 a) In electrophoresis, solution migrates either to anode or to the cathode depending upon the positively or negatively charged solution
 b) Electrophoresis is a useful method for finding the charge of a solution
 c) Electrophoresis with a high potential is helpful in destroying an emulsion
 d) Colloids are uncharged particles and do not migrate towards the electrodes when electric field is applied
316. Blue colour of the sky and red colour of the sunsets are due to
 a) Scattering of light from the sun
 b) Scattering of light from particles of dust in the atmosphere
 c) Refraction of blue light by impurities in sea water
 d) Scattering of light due to ozone layer
317. AlCl_3 in Friedel-Crafts reaction acts as :
 a) Oxidizing agent b) Reducing agent c) Acid catalyst d) None of these
318. Potassium stearate is obtained by the saponification of an oil or fat. It has the formula $\text{CH}_3 - (\text{CH}_2)_{16} - \text{COO}^- \text{K}^+$
 The molecular has a lyophobic end $[\text{CH}_3]$ and a lyophilic end $\text{COO}^- \text{K}^+$.
 Potassium stearate is an example for
 a) Lyophobic colloid b) Lyophilic colloid
 c) Multimolecular colloid d) Associated colloid or micelle
319. The coagulating power of an electrolyte for arseniousulphide decreases in order
 a) $\text{Na}^+ > \text{Al}^{3+} > \text{Ba}^{2+}$ b) $\text{PO}_4^{3-} > \text{SO}_4^{2-} > \text{Cl}^-$ c) $\text{Cl}^- > \text{SO}_4^{2-} > \text{PO}_4^{3-}$ d) $\text{Al}^{3+} > \text{Ba}^{2+} > \text{Na}^+$
320. A biological catalyst is
 a) The N_2 molecule b) An enzyme c) An amino acid d)
321. Which of the following is most suitable to disperse benzene in water?
 a) 
 b) 
 c) 
 d) 
322. In colloid particles, range of diameter is
 a) 1 to 100 nm b) 1 to 1000 cm c) 1 to 1000 mm d) 1 to 100 km
323. Catalysis is a phenomenon in which
 a) A substance alters the speed of the chemical reaction
 b) Heat is evolved in a chemical reaction
 c) The reaction is induced by light
 d) None of the above
324. Among the following, the surfactant that will form micelles in aqueous solution at the lowest molar concentration at ambient conditions, is
 a) $\text{CH}_3(\text{CH}_2)_{15}\text{N}^+(\text{CH}_3)_3\text{Br}^-$ b) $\text{CH}_3(\text{CH}_2)_{11}\text{OSO}_3^- \text{Na}^+$
 c) $\text{CH}_3(\text{CH}_2)_6\text{COO}^- \text{Na}^+$ d) $\text{CH}_3(\text{CH}_2)_{11}\text{N}^+(\text{CH}_3)_3\text{Br}^-$

325. When a sulphur sol is evaporated sulphur is obtained. On mixing with water sulphur sol is not formed. The sol is
 a) Lyophilic b) Reversible c) Hydrophobic d) Hydrophilic
326. Which is correct in the case of van der Waals' adsorption?
 a) High temperature, low pressure b) Low temperature, high pressure
 c) Low temperature, low pressure d) All of the above
327. Sulphur colloid is prepared by
 a) Mechanical dispersion b) Oxidation
 c) Electrical dispersion d) Reduction
328. The precipitate of $\text{Fe}(\text{OH})_3$ in presence of water containing some FeCl_3 becomes colloidal on gentle shaking. This is an example of
 a) Electroosmosis b) Coagulation c) Peptization d) Electrophoresis
329. Cod liver oil is
 a) An emulsion b) Solution c) Colloidal solution d) Suspension
330. Animal charcoal is used in decolourising colour of liquids because it is a good
 a) Adsorbate b) Adsorbent c) Oxidising agent d) Reducing agent
331. Which of the following electrolyte will have maximum flocculation value for $\text{Fe}(\text{OH})_3$ sol?
 a) NaCl b) Na_2S c) $(\text{NH}_4)_3\text{PO}_4$ d) K_2SO_4
332. Which of the following is a lyophobic colloidal solution?
 a) Aqueous starch solution b) Aqueous protein solution
 c) Gold sol d) Polymer solutions in some organic solvents
333. Which is an example of auto-catalyst?
 a) Hydrolysis of methyl acetate
 b) Decomposition of TNG
 c) Oxidation of oxalic acid by KMnO_4
 d) All of the above
334. Pd can adsorb in the space between its atoms, 900 times its volume of hydrogen. This process is called
 a) Absorption b) Desorption c) Adsorption d) Chemisorptions
335. The gold number of gelatin, haemoglobin and sodium acetate are 0.005, 0.05 and 0.7 respectively. The protective actions will be in order
 a) Gelatin < haemoglobin < sodium acetate b) Gelatin > haemoglobin > sodium acetate
 c) Haemoglobin > gelatin > sodium acetate d) Sodium acetate > gelatin > haemoglobin
336. A catalyst is a substance which
 a) Increases the equilibrium constant of the reaction
 b) Increases equilibrium concentration of products
 c) Does not alter the reaction mechanism
 d) Changes the activation energy of the reaction
337. The extent of adsorption of a gas on a solid depends on
 a) Nature of the gas b) Pressure of the gas
 c) Temperature of the gas d) All of these
338. Which of the following statements is false for enzyme?
 a) pH affects their work b) Temperature affect their work
 c) They always increase E_a d) Their reactivity is specific
339. Fog is a colloidal solution of
 a) Liquid particles dispersed in gas b) Gaseous particles dispersed in a liquid
 c) Solid particles dispersed in liquid d) Solid particles dispersed in gas
340. The activity and selectivity of zeolites as catalyst is based on :
 a) Their pore size
 b) Size of their cavities on the surface

- c) Both (a) and (b)
d) None of the above
341. Gold number gives
a) The amount of gold present in the colloid
b) The amount of gold required to protect the colloid
c) The amount of gold required to break the colloid
d) None of the above
342. Amongst the following chemical reaction, the one representing homogeneous catalysis is
a) $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \xrightarrow{\text{Fe}} 2\text{NH}_3(\text{g})$
b) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightarrow{2\text{NO}} 2\text{SO}_3(\text{g}) + 2\text{NO}(\text{g})$
c) $\text{CO}(\text{g}) + 3\text{H}_2(\text{g}) \xrightarrow{\text{Ni}} \text{CH}_4(\text{g}) + \text{H}_2\text{O}$
d) $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \xrightarrow{\text{V}_2\text{O}_5} 2\text{SO}_3(\text{g})$
343. Which of the following represents the phenomenon of syneresis?
a) Formation of a sol from a gel
b) Migration of colloid in an electric field
c) Separation of the dispersed phase from the gel
d) Process of converting gel into true solution
344. Silica gel is commonly used as :
a) Wetting agent
b) Drying agent
c) Solvent
d) catalyst
345. Which has least gold number?
a) Gelatin
b) Starch
c) Albumin
d) Blood
346. The disperse phase in colloidal iron (III) hydroxide and colloidal gold is positively and negatively charged, respectively. Which of the following statements is not correct?
a) Coagulation in both sols can be brought about by electrophoresis
b) Mixing the sols has no effect
c) Sodium sulphate solution causes coagulation in both sols
d) Magnesium chloride solution coagulates the gold sol more readily than the iron (III) hydroxide sol
347. Which is not correct regarding the adsorption of a gas on surface of a solid?
a) Enthalpy and entropy change is negative
b) Adsorption is more for some specific substance
c) On increasing temperature, adsorption increase progressively
d) It is a reversible reaction
348. Efficiency of a catalyst depends on its:
a) Particle size
b) Solubility
c) Molecular weight
d) None of these
349. Choose the incorrect statement
a) If the mutual affinity between the dispersed phase and the dispersion medium is small, the system will be lyophobic
b) If the mutual affinity between the dispersed phase and dispersion medium is great, the system will be lyophilic
c) In a system, when water is the dispersion medium, the system may be hydrophobic or hydrophilic
d) Ionic surfactant molecules cluster together in clumps
350. The colloidal system of a solid dispersed in liquid medium, is called
a) Aerosol
b) Sol
c) Gel
d) Foam
351. Which of the following statements is incorrect?
a) Emulsions are prepared by shaking two liquid components, say oil and water and adding some emulsifying agent
b) Water-in-oil emulsions are formed when the emulsifying agent at the interface is chiefly in the water phase
c) Water-in-oil emulsions are formed when the emulsifying agent at the interface is chiefly in the oil phase
d) Gems and gels mixed together to give emulsion
352. Hydrolysis of cane sugar is catalysed by :
a) H^+
b) Mineral acids
c) Enzymes
d) All of these

353. When a catalyst increases the rate of a chemical reaction, the rate constant :
 a) Increases b) Decreases c) Remains constant d) Becomes infinite
354. The charge on As_2S_3 sol is due to the adsorption of :
 a) H^+ b) OH^- c) O_2^- d) S^{2-}
355. Platinum is not used as a catalyst in the :
 a) Oxidation of CH_3OH to HCHO
 b) Oxidation of SO_2 to SO_3
 c) Combination of H_2 and I_2 to form HI
 d) Synthesis of NH_3 from N_2 and H_2
356. A catalyst alter the rate of reaction by
 a) Altering enthalpy b) Altering internal energy
 c) Altering energy of activation d) All of the above
357. The name aquadag refers for :
 a) Cu in water sol b) Pt in water sol c) Graphite in water sol d) None of these
358. Active charcoal is a good catalyst because
 a) Made up of carbon atoms b) Is very reactive
 c) Has more adsorption power d) Has inert nature toward reagent
359. An aerosol is a
 a) Dispersion of a solid or liquid in a gas b) Dispersion of a solid in a liquid
 c) Dispersion of a liquid in a liquid d) Solid solution
360. Which of the following reaction is an example for homogeneous catalysis?
 a) $2\text{H}_2\text{O}_2(l) \xrightarrow{\text{MnO}_2(s)} 2\text{H}_2\text{O}(l) + \text{O}_2(g)$ b) $2\text{SO}_2(g) + \text{O}_2(g) \xrightarrow{\text{V}_2\text{O}_5(s)} 2\text{SO}_3(g)$
 c) $2\text{CO}(g) + \text{O}_2(g) \xrightarrow{\text{NO}(g)} 2\text{CO}_2(g)$ d) $\text{H}_2(g) + \text{C}_2\text{H}_4(g) \xrightarrow{\text{Ni}(s)} \text{C}_2\text{H}_6(g)$
361. The correct statement in case of milk :
 a) Milk is an emulsion of fat in water
 b) Milk is an emulsion of protein in water
 c) Milk is stabilized by protein
 d) Milk is stabilized by fat
362. Which of the following acts as protective colloid?
 a) Silica gel b) Gelatin c) Sodium acetate d) None of these
363. When dilute aqueous solution of AgNO_3 (excess) is added to KI solution, positively charged sol of AgI is formed due to adsorption of of
 a) NO_3^- b) O_2^- c) Ag^+ d) K^+
364. Colloidal solution of arsenious sulphide can be prepared by :
 a) Electrodispersion method
 b) Peptization
 c) Double decomposition
 d) hydrolysis
365. Chemisorption is :
 a) Multimolecular in nature
 b) Reversible
 c) Often highly specific and directional
 d) Not very specific
366. Which one of the following statements is incorrect about enzyme catalysis?
 a) Enzymes are denaturated by ultraviolet rays and at high temperature
 b) Enzymes are least reactive at optimum temperature
 c) Enzymes mostly proteinous in nature
 d) Enzyme action is specific

367. Alum purify muddy water by
 a) Dialysis
 c) Coagulation
 b) Adsorption
 d) Forming a true solution
368. The continuous phase contains the dispersed phase throughout, example is
 a) Water in milk
 c) Water droplets in mist
 b) Fat in milk
 d) Oil in water
369. A catalyst is used
 a) To balance the reaction
 c) To alter the velocity of reaction
 b) To vaporise the compound
 d) To kill the enzymes
370. In the formation of SO_3 by SO_2 and O_2 using NO as catalyst, the catalytic action of NO is evidenced by :
 a) Green vapours
 b) Violet vapours
 c) Brown vapours
 d) None of these
371. A catalytic poison is
 a) Heterogeneous catalyst
 c) Induced catalyst
 b) Autocatalyst
 d) An inhibitor
372. Which does not show Tyndall effect?
 a) Emulsion
 b) Blood
 c) Milk
 d) Sugar solution
373. Catalytic poisoners act by :
 a) Coagulating the catalyst
 b) Getting adsorbed on the active centres on the surface of catalyst
 c) Chemical combination with any one of the reactants
 d) None of the above
374. Peptization is a process of :
 a) Precipitating colloidal particles
 b) Purifying colloidal particles
 c) Dispersing the precipitate into colloidal state
 d) None of the above
375. Gas masks containing activated charcoal to remove poisonous gases from atmosphere acts on the principle of :
 a) Adsorption
 b) Absorption
 c) Sorption
 d) All of these
376. Pick out the statement which is not relevant in the discussion of colloids.
 a) Sodium aluminium silicate is used in the softening of hard water
 b) Potash alum is used in shaving rounds and as a styptic in medicine
 c) Artificial rain is caused by throwing electrified sand on the clouds from an aeroplane
 d) Deltas are formed at place where the river pours its water into the sea
377. Some types of gels like gelatin liquefy on shaking, thereby changing into sols. The sols on standing changes back into gel. The process is known as :
 a) Syneresis
 b) Thixotropy
 c) Peptisation
 d) Imbibition
378. Which is an example of negative catalysis?
 a) $2\text{H}_2\text{O}_2 \xrightarrow{\text{Pt}} 2\text{H}_2\text{O} + \text{O}_2$
 c) $2\text{KClO}_3 \xrightarrow{\text{MnO}_2} 2\text{KCl} + 3\text{O}_2$
 b) $\text{N}_2 + 3\text{H}_2 \xrightarrow{\text{Fe}} 2\text{NH}_3$
 d) $4\text{CHCl}_3 + 3\text{O}_2 \xrightarrow{\text{C}_2\text{H}_5\text{OH}} 4\text{COCl}_2 + 2\text{Cl}_2 + 2\text{H}_2\text{O}$
379. The decomposition of hydrogen peroxide can be slowed by the addition of acetamide. The latter acts as a
 a) Detainer
 b) Stopper
 c) Promoter
 d) Inhibitor
380. Catalyst :
 a) Lowers activation energy
 b) Increase activation energy
 c) May increase or may decrease activation energy
 d) Brings out equilibrium
381. If dispersion medium is water, the colloidal system is called :
 a) Sol
 b) Aerosol
 c) Organosol
 d) Aquasol

382. The phenomenon in which adsorption and absorption takes place simultaneously is called:
 a) Desorption
 b) Sorption
 c) Both (a) and (b)
 d) None of these
383. Adsorption is accompanied by
 a) ΔS of system is negative
 b) Decrease in enthalpy of system
 c) $T\Delta S$ for the process is negative
 d) All of the above
384. Which is not a property of hydrophilic sols?
 a) High concentrations of dispersed phase can be easily attained
 b) Coagulation is reversible
 c) Viscosity and surface tension are about the same as of dispersion medium
 d) The charge of the particle depends on the pH values of the dispersion medium; it may be positive, negative
385. Which one of the following does not involve coagulation?
 a) Formation of delta regions
 b) Peptization
 c) Treatment of drinking water by potash alum
 d) Clotting of blood by the use of ferric chloride
386. Which is the wrong pair?
 (i) Starch solution : sol (ii) Aq. NaCl : true solution (iii) milk : emulsion (iv) Aq. BaSO₄ : true solution
 a) (i) b) (iii) c) (iv) d) (ii)
387. Which reaction gives colloidal solution?
 a) $\text{Cu} + \text{HgCl}_2 \rightarrow \text{CuCl}_2 + \text{Hg}$
 b) $2\text{HNO}_3 + 3\text{H}_2\text{S} \rightarrow 3\text{S} + 4\text{H}_2\text{O} + 2\text{NO}$
 c) $2\text{Mg} + \text{CO}_2 \rightarrow 2\text{MgO} + \text{C}$
 d) $\text{Cu} + \text{CuCl}_2 \rightarrow \text{Cu}_2\text{Cl}_2$
388. Which is universally correct for catalyst?
 a) A catalyst remains unchanged chemically at the end of chemical reaction
 b) A catalyst takes part in a chemical reaction
 c) All kinds of catalysts undergo catalytic poisoning
 d) A catalyst physically changes at the end of reaction
389. A catalyst
 a) Lowers the activation energy
 b) Changes the rate constant
 c) Changes the product
 d) Itself destroys in the reaction
390. Hydrolysis of maltose (C₁₂H₂₂O₁₁) by maltase gives :
 a) Glucose b) Fructose c) Both (a) and (b) d) None of these
391. Platinized asbestos used as a catalyst in the manufacture of H₂SO₄ is an example of :
 a) Heterogeneous catalyst
 b) Autocatalyst
 c) Homocatalyst
 d) Induced catalyst
392. In Haber's process for manufacture of ammonia, the reaction is usually carried at about 500°C. If a temperature of about 250°C was used then
 a) A catalyst would be of no use at all at this temperature
 b) The rate of formation of ammonia would be too slow
 c) No ammonia would be formed at all
 d) The percentage of ammonia in the equilibrium mixture would be too low
393. Solvent hating colloids are :
 a) Lyophobic b) Hydrophilic c) Lyophilic d) None of these
394. The gold numbers of some colloidal solutions are given below

Colloidal solution	Gold number
A	0.01
B	2.5
C	20

The protective nature of these colloidal solutions follow the order

- a) $C > B > A$ b) $A > B > C$ c) $A = B = C$ d) $B > A > C$

395. A catalyst increases the rate of reaction because it :

- a) Increases the activation energy
b) Decrease the energy barrier for reaction
c) Decreases the collision diameter
d) Increase the temperature coefficient

396. Pick out the wrong statement.

- a) Micelles are formed by surfactant molecules above the Critical Micelle Concentration (CMC)
b) The conductivity of a solution having surfactant molecules decreases sharply at the (CMC)
c) Lower is the CMC of detergent, more is its detergency
d) Cleansing action is not related to micelles

397. Catalyst only

- a) Decreases activation energy b) Increases activation energy
c) Bring about equilibrium d) None of the above

398. A precipitate is changed to colloidal solution by the following process

- a) Dialysis b) Ultrafiltration c) Peptization d) Electrophoresis

399. The Brownian movement is due to

- a) Enthalpy change during the formation of colloids
b) Attractive forces between the colloidal particles and the molecules of dispersion medium
c) The impact of molecules of the dispersion medium on the colloidal particles
d) The movement of positively charged colloidal particle to negatively charged particle

400. Catalyst used in Haber's process is

- a) Nickel powder b) Iron and molybdenum powder
c) Black lead d) Iodine

401. The capacity of an ion to coagulate a colloidal solution depends on :

- a) Its shape
b) Amount of its charge
c) The sign of charge
d) Both amount and sign of the charge

402. The ion that is more effective for the coagulation of As_2S_3 sol is

- a) Ba^{2+} b) Na^+ c) PO_4^{3-} d) Al^{3+}

403. The reaction rate at a given temperature is slower when :

- a) The energy of activation is higher
b) The energy of activation is lower
c) Entropy changes
d) Initial concentration of the reactants remains constant

404. Hardy-Schulze law states that

- a) Higher the charge of the coagulating ions, greater its coagulating power, having opposite sign of solution
b) Solution must have zero gold number
c) Disperse phase and dispersion medium must be of the same sign
d) Micelles coagulate in presence of surfactants

405. Choose the intrinsic colloids among the following

- a) Sulphur b) Arsenic sulphide c) Egg albumen d) Ferric hydroxide

406. Enzymes are :
- a) Substances made by chemists to activate washing powder
 - b) Very active vegetable catalysts
 - c) Catalysts found in organisms
 - d) Synthetic catalysts
407. Whenever, gels are placed with their dispersed phase, they :
- a) Swells up
 - b) Show intake of the dispersed phase
 - c) Develops imbibition
 - d) All of the above
408. Which forms multi molecular layers during adsorption?
- a) Physical adsorption
 - b) van der Waals' adsorption
 - c) Freundlich adsorption
 - d) All of the above
409. Enzyme catalysts are :
- a) Highly specific in nature
 - b) Non-specific
 - c) Solids
 - d) Always liquid
410. A catalyst :
- a) Increases the average kinetic energy of the reacting molecules
 - b) Increases the activation energy
 - c) Alters the reaction mechanism
 - d) Increases the frequency of collisions of the reacting species
411. Micelle systems are used in
- a) Gums
 - b) Magnetic separation process
 - c) Petroleum recovery
 - d) All of the above
412. Enzymes are known to increase the rate of reaction by :
- a) 10^2 times
 - b) 10^{-2} times
 - c) 10^5 times
 - d) 10^{12} times
413. A catalyst promoter
- a) Increases the speed of the reaction
 - b) Activates the action of a catalyst
 - c) Starts a chemical reaction
 - d) None of the above
414. Soaking of water by a sponge is an example of :
- a) Physical adsorption
 - b) Chemical adsorption
 - c) Absorption
 - d) None of these
415. Indicate the correct statement
- a) In chemisorptions, there is no disruption of bonding in an adsorbed molecule
 - b) The rate of decomposition of the substance adsorbed on a surface depends on the surface coverage
 - c) In heterogeneous catalytic reaction no surface reaction occurs
 - d) Increase in surface area of catalyst reduces the surface phase reactions
416. Cellulose dispersed in ethanol is called
- a) Emulsion
 - b) Collodion
 - c) Micelle
 - d) Hydrophilic sol
417. A liquid aerosol is a colloidal system of :
- a) A liquid dispersed in a solid
 - b) A liquid dispersed in a gas
 - c) A gas dispersed in a liquid
 - d) A solid dispersed in a gas
418. The disperse phase, dispersion medium and nature of colloidal solution (lyophilic or lyophobic) of 'gold sol' respectively are

- a) Solid, Solid, lyophobic
c) Solid, Liquid, Lyophobic
- b) Liquid, Liquid, Lyophobic
d) Solid, Liquid, Lyophilic
419. An emulsion is a colloidal dispersion of
a) A liquid in a gas b) A liquid in a liquid c) A solid in a liquid d) A gas in a solid
420. Blue colour of water in sea is due to
a) Refraction of blue light by impurities b) Refraction of blue sky by water
c) Scattering of light by water d) None of the above
421. Which of the following is an example of biochemical catalyst?
a) Platinum gauze b) Oxides of Nitrogen
c) Zymase d) V_2O_5
422. Which one of the following statements is incorrect?
a) Adsorption always leads to a decrease in enthalpy and entropy of the system
b) Adsorption arises due to unsaturation of valence forces of atoms or molecules on the surface
c) Adsorption increases with rise in the temperature
d) Adsorption decreases the surface energy
423. In emulsion the dispersed phase and dispersion medium are :
a) Both solids b) Both liquids c) A solid and liquid d) A liquid and solid
424. Which graph represents auto catalysis?
- a)

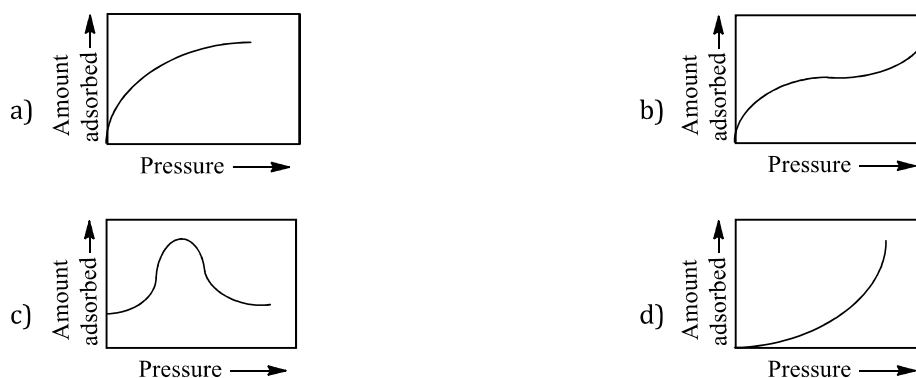
b)

c)

d)
425. The Rubin number which was proposed by Ostwald as an alternative to the Gold number in order to measure the protective efficiency of a lyophilic colloid may be defined as the
a) Mass in milligrams of a colloid per 100 cc of solution which just prevents the colour change of standard sol of dye Congo-Rubin from red to violet when 0.16 g eq. KCl is added to it
b) Mass in grams of a colloid per 100 cc of solution which just prevents the colour change of standard sol of dye Congo-Rubin from red to violet when 0.1 M KCl is added to it
c) Mass in grams of a colloid per 100 cc of solution which just prevents the colour change of standard sol of dye Congo-Rubin from red to violet when 0.2 M KCl is added to it
d) Mass in grams of a colloid per 100 cc of solution which just prevents the colour change of standard sol of dye Congo-Rubin from red to violet when 1 M KCl is added to it
426. Which of the following is applicable to chemisorption?
a) It occurs at high temperature
b) There is formation monomolecular layer
c) It involves the formation of chemical bonds between adsorbent and adsorbate
d) All of the above
427. Which of the following is used to provide smoke screens :
a) Calcium phosphide b) Zinc sulphate c) Sodium carbonate d) Zinc phosphide
428. The process of froth floatation and chromatography are based on :
a) Emulsification b) Adsorption c) Absorption d) Either of them
429. The efficiency of enzyme catalysis is due to its capacity to
a) Form a strong enzyme-substrate complex
b) Change the shape of the substrate
c) Lower the activation energy of the reaction
d) Form a colloidal solution in water
430. Which acts as a promoter for nickel in the hydrogenation of oils?

- a) Cu b) Mo c) Fe d) Pt
431. In Langmuir's model of adsorption of a gas on a solid surface
- The rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered
 - The adsorption at a single site on the surface may involve multiple molecules at the same time
 - The mass of gas striking a given area of surface is proportional to the pressure of the gas
 - The mass of gas striking a given area of surface is independent of the pressure of the gas
432. Cloud bursts due to :
- Attraction towards the electrical charges on the earth
 - Large amount of water present in the cloud
 - Dense clouds are present in the upper atmosphere
 - Mutual discharge of oppositely charged clouds resulting in the coagulation
433. Bleeding due to a cut can be stopped by applying ferric chloride solution in the laboratory. This is due to
- Coagulation of negatively charged blood particles by Fe^{3+} ions.
 - Coagulation of positively charged blood particles by Cl^- ions.
 - Reaction taking place between ferric ions and the haemoglobin forming a complex
 - Common element, iron, in both FeCl_3 and haemoglobin
434. Surface tension of lyophilic sols is :
- Lower than H_2O
 - More than H_2O
 - Equal to H_2O
 - None of these
435. Which is used in the Haber's process for the manufacture of NH_3 ?
- Al_2O_3
 - $\text{Fe} + \text{Mo}$
 - CuO
 - Pt
436. Tails of comets are visible due to :
- Tyndall effect
 - Reflection
 - Brownian motion
 - None of these
437. The minimum flocculation power of KCl , MgCl_2 , CrCl_3 and SnCl_4 for a positively charged sol are in the order of
- $\text{KCl} < \text{MgCl}_2 < \text{CrCl}_3 < \text{SnCl}_4$
 - $\text{KCl} = \text{MgCl}_2 = \text{CrCl}_3 = \text{SnCl}_4$
 - $\text{MgCl}_2 < \text{KCl} < \text{CrCl}_3 < \text{SnCl}_4$
 - $\text{SnCl}_4 < \text{CrCl}_3 < \text{MgCl}_2 < \text{KCl}$
438. Smoke (a negatively charged colloid) is an example of :
- Gas dispersed in liquid
 - Gas dispersed in solid
 - Solid dispersed in gas
 - Solid dispersed in solid
439. Which one of the following is an example for homogeneous catalysis?
- Manufacture of sulphuric acid by Contact process
 - Manufacture of ammonia by Haber's process
 - Hydrolysis of sucrose in presence of dilute hydrochloric acid
 - Hydrogenation of oil
440. Which is not true in case of catalyst?
- The catalyst is unchanged chemically at the end of a reaction
 - The catalyst accelerates the reaction
 - In a reversible reaction, the catalyst alters the equilibrium position
 - A small amount of catalyst is often sufficient to bring about a large change in reaction
441. Which of the following is not the property of hydrophilic sol.?
- Coagulation is reversible
 - Viscosity and surface tension are equal to that of water
 - Charge on the particle depends upon pH of the medium. It may be positive, negative or zero
 - Dispersed phase acquires higher concentration easily
442. Point out the false statement
- The size range of colloidal particles is $10 - 2000 \text{ \AA}$
 - Colloidal solutions are homogeneous systems

- c) Colloids carry charge
d) Colloids show Tyndall effect
443. Soaps are generally prepared from :
a) Linseed oil b) Coconut oil c) Groundnut oil d) Mustard oil
444. Which of the following is not a surfactant :
a) $\text{CH}_2(\text{CH}_2)_{15}-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{N}^+}}-\text{CH}_3\text{Br}^-$
b) $\text{CH}_3(\text{CH}_2)_{14}\text{CH}_2\text{NH}_2$
c) $\text{CH}_3(\text{CH}_2)_{16}\text{CH}_2\text{OSO}_2^-\text{Na}^+$
d) Decyl pyridinium chloride
445. A catalyst for a reversible reaction is a substance that :
a) Supplies energy to the reaction
b) Decreases the time to reach equilibrium
c) Increases the equilibrium concentration of the products
d) Change the equilibrium constant of the reaction
446. In a reversible reaction, a catalyst
a) Increases the rate of forward reaction only
b) Increases the rate of forward reaction and decreases that of backward reaction
c) Increases the rate of forward and backward reaction equally
d) Increases the rate of forward reaction to great extent than that of backward reaction
447. The concentration of electrolyte required to coagulate a given amount of As_2S_3 sol is minimum in the case of
a) Magnesium nitrate b) Potassium nitrate c) Potassium sulphate d) Aluminium nitrate
448. Paste is
a) Suspension of solid in a liquid b) Mechanical dispersion of a solid in liquid
c) Colloidal solution of a solid in solid d) None of the above
449. Which of the following is not an emulsion?
a) Butter b) Ice cream c) Milk d) Clouds
450. Emulsifying agents generally used are :
a) Ions with negative charge
b) Surface active agents
c) Ions with a positive charge
d) Lyophobic substances
451. The catalyst used in lead chamber process of H_2SO_4 manufacture is
a) Platinum b) Oxides of nitrogen
c) Nickel d) Vanadium compounds
452. Hydrolysis of sucrose ($\text{C}_{12}\text{H}_{22}\text{O}_{11}$) by invertase gives :
a) Glucose b) Fructose c) Both(a) and (b) d) None of these
453. Which one of the following characteristics is not correct for physical adsorption?
a) Adsorption on solids is reversible
b) Adsorption increases with increase in temperature
c) Adsorption is spontaneous
d) Both enthalpy and entropy of adsorption are negative
454. Which of the following curves do not correspond to adsorption isotherms?



455. In a reversible reaction, the catalyst
- Increases the activation energy of the backward reaction
 - Increases the activation energy of the forward reaction
 - Decreases the activation energy of both forward and backward reaction
 - Decreases the activation energy of forward reaction
456. Which acts as poison to platinum (a catalyst) in the manufacture of H_2SO_4 by contact process?
- Arsenious oxide
 - CO_2
 - CO
 - Sodium sulphide
457. Which among the following statements are correct with respect to adsorption of gases on a solid?
- The extent of adsorption is equal to Kp^n according to Freundlich isotherm.
 - The extent of adsorption is equal to $Kp^{1/n}$ according to Freundlich isotherm.
 - The extent of adsorption is equal to $(1 + bp)/ap$ according to Langmuir isotherm.
 - The extent of adsorption is equal to $ap/(1 + bp)$ according to Langmuir isotherm.
 - Freundlich adsorption isotherm fails at low pressure, where k , a and b are constant and p is pressure
- (i) and (iii)
 - (i) and (iv)
 - (ii) and (iii)
 - (ii) and (iv)
458. Which of the following is adsorbed greatly by activated charcoal?
- SO_2
 - CO_2
 - NO_2
 - Water vapours
459. Choose macromolecular colloids among the following
- Soap
 - Detergent
 - Starch and cellulose
 - All of these
460. In aerosol, the dispersion medium is
- Solid
 - Liquid
 - Gas
 - Any of these
461. Which acts as poison for Pd-charcoal in Lindlar's catalyst?
- BaSO_4
 - Quinoline
 - Both (a) and (b)
 - None of these
462. Which acts as negative catalyst?
- Lead tetraethyl as antiknock compound
 - Glycerol in decomposition of H_2O_2
 - Ethanol in oxidation of chloroform
 - All of the above
463. From the following which is not a surface phenomenon?
- Corrosion
 - Crystallisation
 - Heterogenous catalysis
 - None of the above
464. Hydrolysis of protein in stomach and in intestine takes place due to action of enzyme :
- Pepsin in stomach, trypsin in intestine
 - Trypsin in stomach, pepsin in intestine
 - Both (a) and (b)
 - None of the above
465. Which of the following is less than zero during adsorption?
- ΔG
 - ΔS
 - ΔH
 - All of these

466. Which one of the following methods, does not give the sol?

- a) Electrophoresis b) Peptization c) Electrodispersion d) Solvent exchange

