



CHEMISTRY

BOOKS - JMD CHEMISTRY (PUNJABI ENGLISH)

SURFACE CHEMISTRY

Example

1. Read the following passage and answer the questions.

Adsorption is surface phenomenon and it differs from absorption, which occurs throughout the body of the substance which absorbs. In physisorption, the attractive forces are mainly van der Waals forces while in chemisorption actual bonding occurs between the particles of adsorbent and adsorbate. Generally, easily liquefying gases are adsorbed more easily on the surface of a solid as compared to the gases which are liquefied with difficulty. Adsorption increases with the increase in pressure and decreases as the temperature is increased.

Arrange the following gases in the decreasing order of the ease with which they are adsorbed on charcoal. H_2 , CH_4 , CO_2 and NH_3



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2. Read the following passage and answer the questions.

Adsorption is surface phenomenon and its differ from absorption, Which occurs throughout the body of the substance which

absorbs. In physisorption, the attractive forces are mainly van der Waals forces while in chemisorption actual bonding occurs between the particles of adsorbent and adsorbate. Generally, easily liquefying gases are adsorbed more easily on the surface of a solid as compared to the gases which are liquefied with difficulty. Adsorption increases with the increase in pressure and decreases as the temperature is increased.

What is the effect of pressure on the extent of adsorption ?



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as compared to the gases which are liquified with difficulty. Adsorption increases with the increase in pressure and decreases as the temperature is increased.

What is the effect of temperature on the extent of adsorption ?



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4. Read the following passage and answer the questions.

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Is the process of adsorption exothermic or endothermic ?



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Out of physisorption and chemisorption which has more enthalpy of adsorption ?



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6. Read the following passage and answer the questions.

There are certain substances which behave as normal strong electrolytes at low concentration but at higher concentration they behave as colloidal solutions due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps and detergents are the examples of associated colloids. The formation of micelles takes place above certain concentration called critical micellisation concentration (CMC) and a

characteristic temperature called Kraft temperature.

In case of colloids, what does CMC stand for ?



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7. Read the following passage and answer the questions.

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Give an example of associated colloid used in our daily life ?



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8. Read the following passage and answer the questions.

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What is the role of CMC in micelle formation ?



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micellisation concentration (CMC) and a characteristic temperature called Kraft temperature.

What is the role of Kraft temperature in micelle formation ?



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11. Read the following passage and answer the questions.

When colloidal solutions are viewed under a powerful ultramicroscope, the colloidal

particles appear to be in a state of continuous zig-zag motion all over the field of view. This motion was first observed by the British botanist, Robert Brown, and is known as Brownian movement.

This motion is independent of the nature of the colloid but depends on the size of the particles and viscosity of the solution. Smaller the size and lesser the viscosity, faster is the motion.

The Brownian movement has been explained to be due to the unbalanced bombardment of the particles by the molecules of the

dispersion medium. The Brownian movement has a stirring effect which does not permit the particles to settle and thus, is responsible for the stability of sols.

What is Brownian movement ?



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What is the effect of particle size on Brownian movement ?



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What is the effect of viscosity of dispersion medium on Brownian movement ?



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14. Read the following passage and answer the questions.

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What is the cause of Brownian movement ?



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What is the role of Brownian movement in the stability of sols ?



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16. Read the following passage and answer the questions.

Ultrafiltration is the process of separating the colloidal particles from the solvent and soluble solutes present in the colloidal solution by specially prepared filters, which are permeable to all substances except the colloidal particles. Colloidal particles can pass through ordinary filter paper because the pores are too large. However, the pores of filter paper can be reduced in size by impregnating with collodion solution to stop

the flow of colloidal particles. The usual collodion is a 4% solution of nitrocellulose in a mixture of alcohol and ether. An ultra-filter paper may be prepared by soaking the filter paper in a collodion solution, hardening by formaldehyde and then finally drying it. Thus, by using ultra-filter paper, the colloidal particles are separated from rest of the materials. Ultrafiltration is a slow process. To speed up the process, pressure or suction is applied. The colloidal particles left on the ultra-filter paper are then stirred with fresh dispersion medium (solvent) to get a pure

colloidal solution.

What is ultrafiltration ?



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Why ordinary filter paper can not be used for ultrafiltration ?



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What is collodion ?



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How can you convert an ordinary filter paper into an ultrafilter paper ?



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20. Read the following passage and answer the questions.

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How can you speed up the process of ultrafiltration ?



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21. Read the given passage and answer the questions

A substance which alters the rate of chemical reaction without undergoing any change in mass and chemical composition at the end of reaction is called catalyst. It may be noted that

catalyst which increases the speed of a reaction is called positive catalyst and catalyst which decrease the speed of reaction is called negative catalyst. The promoters are substances that enhance the activity of catalyst and poisons are the substances which decrease the activity of catalyts.

What are poisons ?



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How many types of catalyts are there ?



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What are a positive catalysts ?



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What are poisons ?



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25. Read the given passage and answer the questions

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catalyst and poisons are the substances which decrease the activity of catalyts.

What are promoters ?



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26. At CMC, the surfactant molecules decompose, become completely soluble, associate, dissociate.

A. decompose

B. become completely soluble

C. associate

D. dissociate

Answer: C



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27. Colloidal sol is :

A. True solution

B. Suspension solution

C. Heterogeneous solution

D. Homogeneous solution.

Answer: C



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28. Which of the following is a lyophilic colloid ?

A. Milk

B. Gum

C. Fog

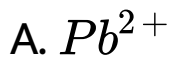
D. Blood.

Answer: B



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29. Which of the following has maximum value of flocculating



D. Na^+

Answer: B



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30. Which of the following is a positively charged sol ?

A. $Fe(OH)_3$

B. Sb_2S_3

C. TiO_2

D. Silver sol.

Answer: A



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31. The zig-zag motion of colloidal particles was first observed by :

A. John Tyndall

B. Robert Brown

C. Zsigmondy

D. Ostwald.

Answer: B



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32. The colloidal system in which the disperse phase and dispersion medium are both liquids is known as :

A. a gel

B. an aerosol

C. an emulsion

D. a foam

Answer: C



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33. In coagulation of a (colloidal) solution of As_2S_3 , which has maximum coagulating power ?

A. NaCl

B. KCl

C. $BaCl_2$

D. $AlCl_3$

Answer: D



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34. Blood may be purified by

A. Dialysis

B. Electro-osmosis

C. Coagulation

D. Filtration.

Answer: A



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35. Tyndall effect is observed in

A. True solution

B. Precipitate

C. Colloidal solution

D. Vapour

Answer: C



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36. Fog is a colloidal solution of

A. solid in a gas

B. liquid in a gas

C. gas in a liquid

D. gas in a solid.

Answer: B



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37. Chromatography is based on the principle of : chemical adsorption hydrogen bonding chemisorption physical adsorption.

A. chemical adsorption

B. hydrogen bonding

C. chemisorption

D. physical adsorption.

Answer: D



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38. In colloidal state, particle size range from :

10–1000Å, 20–50Å, 1–10Å, 1–280Å

A. 10 – 1000Å

B. 20 – 50Å

C. 1 – 10Å

D. 1 – 280Å

Answer: A



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39. As_2S_3 is the example of

- A. positive colloid
- B. negative colloid
- C. neutral colloid
- D. None of these.

Answer: B



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40. Shape selective catalysis is a reaction catalysed by : Zeolites, Enzymes, Platinum, Zeigler-Natta catalyst.

A. Zeolites

B. Enzymes

C. Platinum

D. Zeigler-Natta catalyst.

Answer: A



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41. Out of these which colloidal solution is not a lyophilic colloid ?

A. Gold sol

B. Gelatin

C. Starch

D. Haemoglobin.

Answer: A



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

- A. Electrodialysis
- B. Electrophoresis
- C. Electroosmosis
- D. Cataphoresis.

Answer: C



43. At CMC (Critical Micellisation Conc.) the surface molecules

A. Associate

B. Dissociate

C. Decompose

D. Become completely soluble.

Answer: A



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44. Sb_2S_3 is the example of

- A. positive sol
- B. negative sol
- C. neutral sol
- D. None of these.

Answer: B



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45. As_2S_3 is the example of

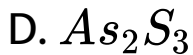
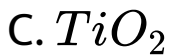
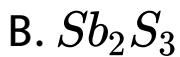
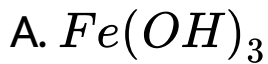
- A. positive colloid
- B. negative colloid
- C. neutral colloid
- D. None of these.

Answer: B



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46. Which of the following is a positively charged sol ?



Answer: A



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47. Rate of physisorption always increases with decrease in temperature. Explain.



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48. Adsorption is an exothermic process. Explain.



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49. In gases, the extent of adsorption always increases with increase in pressure.



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50. What is heterogeneous catalysis ? What role does adsorption play in heterogeneous catalysis ?



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51. Enzymes work best under ordinary conditions of temperature and pH



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52. Stability of multimolecular colloids is due to extensive solvation of colloidal particles.



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53. Soap is an example of an associated colloid.



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54. Lyophilic colloids are more stable than lyophobic colloids. Explain.



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55. Milk is an oil in water type emulsion.



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56. Stability of multimolecular colloids is due to extensive solvation of colloidal particles.



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57. Distinguish between the 'meaning of the terms adsorption and absorption. Give one example of each.



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58. Write four differences between adsorption and absorption.



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59. Adsorption is an exothermic process.

Explain.



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60. Why the rate of physical adsorption decreases with the rise of temperature ?



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61. Give reasons why a finely divided substance is more effective as an adsorbent.



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62. What is the difference between physisorption and chemisorption ?



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63. Differentiate between physical adsorption and chemical adsorption.



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64. What are the factors which influence the adsorption of a gas on a solid ?



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65. What is an anion ?



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66. Can adsorption occur from solutions ? Give examples.



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67. How does adsorption of gases on solids depend upon: Temperature?



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68. Explain two applications of adsorption.



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69. Define Catalyst and Catalysis.



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70. What is heterogeneous catalysis ? What role does adsorption play in heterogeneous catalysis ?





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71. Give the mechanism of heterogeneous catalysed reaction.



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72. What is homogeneous catalysis ? Give some examples.



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73. Give four examples of heterogeneous catalysis.



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74. What do you understand by activity and selectivity of a catalyst ? Give one example of each.



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75. What are Enzymes ? Give important characteristics of enzyme catalysis.



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76. Name four industrial applications of enzymes along with names of enzymes.



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77. What are colloids ?



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78. How can you differentiate between suspension, colloidal solution and true solution ?



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79. Give three differences between lyophilic and lyophobic colloids.



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80. What are lyophilic and lyophobic sols ?

Give one example of each. Why lyophobic sol is easily coagulated ?



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81. What is the difference between multimolecular and macromolecular colloids ?

Give one example of each. How are associated colloids different from these two types of colloids?



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82. What are micelles ? Give one example of a micellar system.



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83. Discuss the cleansing action of soaps.



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84. Write short note on peptisation.



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85. What happens when a freshly precipitated $Fe(OH)_3$ is shaken with little amount of dilute solution of $FeCl_3$?



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86. How will you prepare a colloidal solution of gold?



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87. What is dialysis ? Give its significance.



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88. Write short note on electro-dialysis.



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89. Explain Brownian movement.



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90. What is Tyndall effect ? What is the cause of it ?



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91. Write notes on Hardy Schulze Rule ?



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92. Write short note on

Coagulation or flocculation



Watch Video Solution

93. Define electrophoresis.



Watch Video Solution

94. Write short note on

Electro-osmosis.



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95. What do you understand by protection of colloids ?



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96. What do you mean by gold number ?



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97. What are emulsions ? What are their different types ? Give one example of each type.



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98. What is emulsification ? Explain the role of emulsifier to stabilise the emulsion.



[Watch Video Solution](#)

99. What is emulsification ? Explain the role of emulsifier to stabilise the emulsion.



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100. Mention two uses of emulsions.



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101. How oil in water or water in oil type of emulsions can be identified by dye test ?



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102. What are gels ? Give an example of elastic and non-elastic gel.



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103. Why does the colour of the sky appear blue?



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104. Give suitable explanations for

A delta is formed where a river falls into the sea.



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105. Give five important applications of colloids in home and industry.



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