CHEMISTRY

BOOKS - MHTCET PREVIOUS YEAR PAPERS AND PRACTICE PAPERS

SURFACE CHEMISTRY

Exercise 1

1. Adsorption is the phenomenon in which a substance

A. accumulates on the surface of the other substance

B. goes into the body of the other substance

C. remains close to the other substance

D. None of the above .

Answer: A

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2. Ink is adsorbed on the chalk., in this ink and chalk are respectively

A. adsorbate and adsorbent

B. adsorbent and adsorbate

C. Both adsorbent

D. Both adsorbate

Answer: A

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3. There are certain properties related to adsorption

I. reversible

II. Formation of unimolecular layer

III. , low heat of adsorption

IV., occurs at low temperature and decreases with increasing temperature

Which of the above properties are for physical adsorption ?

A. I , II and III

B. I , III and IV

C. II , III and IV

D. II , IV and III

Answer: B

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4. Physical adsorption is inversely proportional to

A. temperature

B. volume

C. concentration

D. All of these

Answer: A

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

A. It is irreversible

B. It is specific

C. It is multilayer phenomenon

D. Heat of adsorption is of about -400kJ

Answer: C

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6. The rate of chemisorption :

A. decreases with increase of pressure

B. increases with increase of pressure

C. is independent of pressure

D. is independent of temperature

Answer: B

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7. Which of the following is the variation of physical adsorption with temperature ?

A. 

B. 

C. 

D. 

Answer: B

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8. Following reaction is catalysed by Br^-

$2H_2O_2(aq) \rightarrow 2H_2O(\ell) + O_2(g)$

This is an example of

A. homogeneous catalysis

B. heterogeneous catalysis

C. autocatalysis

D. enzyme catalysis

Answer: A

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9. Which one of the following is an example of homogeneous catalysis ?

A. Manufacture of sulphuric acid by contact process

B. Manufacture of ammonia by Haber's process

C. Hydrolysis of sucrose in the presence of dilute hydrochloric acid

D. Hydrogenation of oil

Answer: C

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10. Which of the following catalyst is used during the hydrogenation of oil?

A. Fe

B. Ni

C. Pt

D. Mo

Answer: B

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11. Catalyst increases the rate by

A. by decreasing E_a

B. by increasing E_a

C. by increasing entropy

D. by both (a) and (c)

Answer: A

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12. i. The ability of a catalyst to direct the reaciton to yield particular products is called

a. Reactivity b. Selectivity c. Activity d. Fugacity

ii. Which of the following Is an example of zeolite?

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

(iii) Reactions in zeolite catalyst depends on

a. Pores b. Apertures

c. Size of cavities d. All of these

A. reactivity

B. selectivity

C. activity

D. fugacity

Answer: B

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13. The zeolites have shapes selectivity depending on

A. pore structure

B. atomic structure

C. molecular structure

D. None of the above .

Answer: A

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14. Surface of the eye is protected from bacterial infection by the enzyme

A. carbonic anhydrate

B. urease

C. lysozyme

D. zymase

Answer: C

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15. Which of the following catalyses the conversion of glucose into ethanol?

A. Zymase

B. Invertase

C. Maltase

D. Diastase

Answer: A

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16. Enzyme activity is highest in the temperature range of

A. 015° C

B. $15 - 25^{\circ} C$

C. $25 - 45^{\circ} C$

D. remain same in all

Answer: B

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17. The diameter of colloidal particle is of the order

A. 10^{-3} m

B. 10^{-6} m

C. 10^{-15}m

D. 10^{-7} m

Answer: B

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18. Which type of solutions is not filtrable through filter paper and parchment membrane both ?

A. True solutions and colloidal sol

B. Colloidal sol and suspension

C. True solution and suspension

D. Suspension only

Answer: D

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19. Smoke is a dispersion of

A. gas in gas

B. gas in solid

C. solid in gas

D. liquid in gas

Answer: C

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20. Which of the following sols is hydrophobic ?

A. Starch

B. Gum

C. Sulphur

D. Gelatin

Answer: C

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21. Choose the correct statement .

A. The ultra-filter allow only the electrolytes to pass through under the influence of

pressure or suction pump

B. When an electric field is applied during dialysis , the process is refered to as electrodialysis

C. Both (a) and (b) are correct

D. None of the above .

Answer: C

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22. Which is kinetic phenomenon ?

A. Brownian motion

B. Tyndall effect

C. Both a. and b .

D. None of these

Answer: A

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23. In which of the following Tyndall effect is not observed

A. sugar solution

B. gold solution

C. suspension

D. emulsion

Answer: A

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24. Aluminium hydroxide forms a positively charged sol.

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

A. NaCl

B. $CaCl_2$

C. $Fe_2(SO_4)_3$

D. K_3PO_4

Answer: D

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25. Flocculation value is expressed in terms of

A. milli mol L^{-1}

B. mol L^{-1}

C. mg K^{-1}

D. microgram mL^{-1}

Answer: A

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26. An emulsion can be diluted with H_2O (dispersion medium) , then it is

A. O/W type

B. W/O type

C. Both (a) and (b)

D. None of these

Answer: A

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27. Which of the following (s) is/are w/o type emulsion ?

A. cold cream

B. butter

C. Both (a) and (b)

D. None of these

Answer: C

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28. Select the the correct statement (s)

A. Milk is a type of emulsion

B. Brownian motion is observed in emulsion

C. Cleansing action of soap is due to formation of emulsions (Micelle)

D. All of the above are correct statements

Answer: D

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29. Some of the important characteristics of emulsion are as

(i) Particle size is the ranges from 1000 Å to 10,000 Å

(ii) It shows Brownia motion

(iii) It exhibit Tyndall effect

Point out the correct statement

A. (i) and (ii)

B. (ii) and (iii)

C. (i) and (iii)

D. all of these

Answer: D

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30. Stability of an emulsion is determined by

A. toughness of the emulsifier film

B. electric change on emulsified particles

C. Both (a) and (b)

D. None of the above .

Answer: C

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Exercise 2

1. Extent of adsorption is

A. temperature dependent

B. pressure dependent

C. surface area dependent

D. All of the above

Answer: D

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2. During adsorption , which of the following has negative value ?

A. ΔH

B. ΔG

C. ΔS

D. All of these

Answer: D

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3. The role of the activation charcoal in gas mask used coal mine is

A. absorption of poisonous gases

B. adsorption of poisonous gases

C. neutralisation of gases

D. None of the above .

Answer: B

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4. Gas mask is prepared on the basis of adsorption because

A. it causes absorption of poisonous gases on activated charcoal

B. it causes absorption of gaseous particle

C. it increases oxygen molecule around the atmosphere by decreasing concentration of poisonous gases

D. Both (a) and (c)

Answer: D

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5. Adsorption of gaseous moleculesof hydrogen on Pd is known as

A. reduction

B. occlusion

C. hydration

D. hydrogenation

Answer: B

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6. Point out the correct statement .

A. During adsorption , both enthalpy and entropy are more than zero

B. During adsorption , both enthalpy and entropy are less than zero

C. During adsorption , enthalpy is -ve and entropy is +ve quantity

D. None of the above .

Answer: B

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7. Plot of log $\frac{x}{m}$ 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 10.0 , the amount of the solute adsorbed per gram of adsorbent will be $(\log 5 = 0.6990)$:

A. 1 g

B. 2 g

C. 3 g

D. 5 g

Answer: D

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8. Choose the incorrect statement .

A. Physisorption is a reversible phenomenon having enthalpy of adsorption about 5 kcal mol^{-1}

B. Physisorption is multilayer phenomenon

C. Chemisorption occurs at low temperature

D. Chemisorption occurs due to chemical forces between adsorbate and adsorbent

Answer: C

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9. Powdered substances are more effective adsorbents than their crystalline form because

A. crystalline form has more surface area than powdered form

B. powdered form has more surface area than crystalline form

C. crystalline form adsorbs in low temperature but powdered form requires high temperature

D. None of the above .

Answer: B

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10. The linear plot for Freundich adsorption isotherm is

A. $\log \frac{x}{m}$ versus p

B. $\frac{m}{x}$ versus $\frac{1}{p}$

C. $\log \frac{p}{x/m}$ versus log p

D. $\log \frac{m}{x}$ versus log p

Answer: D

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11. In general, H_2 gas is adsorbad on activated charcoal to a less extent in comparison to the easily liquefiable gases due to

A. very strong van der Waals' force and low critical temperature

B. very weak van der Waals' force and low critical termperature

C. very strong van der Waals' force and high critical temperature

D. very weak van der Waals' force and high critical temperature

Answer: B

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12. For a positively charged sol , the flocculating power of $KCl, MgCl_2, CrCl_3$ and $SnCl_4$ will be in the order

A. $MgCl_2 < KCl < CrCl_3 < SnCl_3$

B. $KCl = MgCl_2 = CrCl_3 = SnCl_4$

C. $KCl < MgCl_2 < CrCl_3 < SnCl_4$

D. $SnCl_4 < CrCl_3 < MgCl_2 < KCl$

Answer: B

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13. LANGMUIR ISOTHERM

A. $\frac{x}{m} = \frac{K'p}{1+Kp}$

B. $\frac{x}{m} = \frac{1+Kp}{K'p}$

C. $\frac{x}{m} = \frac{1+K'p}{Kp}$

D. $\frac{m}{x} = \frac{K'p}{1+Kp}$

Answer: A

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14. Which of the following is the correct approximate value of ratio of size of colloidal particle to suspension ?

A. Equal to 1.5

B. Less than 1

C. Zero

D. 10 Å

Answer: B

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15. How will you test whether a given solution is a colloidal solution ?

A. electrodialysis

B. finding out particle size

C. Tyndall effect

D. Brownian movement

Answer: C

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16. Which of the following is incorrect about adsorption ?

A. It increases humidity of atmosphere

B. It decreases humidity of atmosphere

C. It is pressure dependent

D. It is temperature dependent

Answer: A

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

A. it involves van der Waals' forces which are universal

B. gases involved behave like ideal gases

C. enthalpy of adsorption is low

D. it is a reversible process

Answer: A

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18. Adsorption is always exothermic in nature ,

Do you agree ?

A. $\Delta H < 0$

B. $\Delta H > 0$

C. $\Delta H = 0$

D. None of these

Answer: A

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19. A colloidal solution is subjected to an electrical field. The particle move towards anode. The coagulation of same sol is studied using $NaCl, BaCl_2$ and $AlCl_3$ solutions. Their coagulating power should be

A. $Bacl_2 > NaCl > AlCl_3$

B. $NaCl > BaCl_2 > AlCl_3$

C. $AlCl_3 > BaCl_2 > NaCl$

D. $NaCl > AlCl_3 > BaCl_2$

Answer: C

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20. Identify the gas which is readily adsorbed by activated charcoal .

A. H_2

B. N_2

C. SO_2

D. O_2

Answer: C

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21. In physisorption , the molecules of adsorbate held to the adsorbent by

A. chemical forces

B. ionic forces

C. van der Waals' forces

D. None of these

Answer: C

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22. In general , which of the following gets adsorbed readily ?

A. Permanent gases

B. Easily liquefiable gases

C. All gases have same adsorbing tendency

D. None of the above .

Answer: B

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