PRACTICE PAPER

CHEMICAL KINETICS - SURFACE CHEMISTRY

1] The unit and value of rate constant and that of rate of reaction are same for

a) first order b) zero order c) second order d) none of these

2] For a reaction, the rate of reaction was found to increase about 1.8 time when the temperature was increased by 10^0C. The increase in rate is not due to

a) increase in number of active molecules

b) increase in activation energy of reactants

c) decrease in activation energy of reactants

d) increase in the number of collisions between reacting molecules

3] In acidic medium the rate of reaction between BrO_3^- and Br^- ions is given by the expression,

$-\frac{d[BrO_3^-]}{dt} = k[BrO_3^-][Br^-][H^+]^2$. It means

a) rate constant of overall reaction is 4 sec^{-1}

b) rate of reaction is independent of the conc. of acid

c) the change in pH of the solution will not affect the rate

d)doubling the conc. of H^+ ions will increase the reaction rate by 4 times

LIVEWORKSHEETS

4] The reaction of $aA + bB + cC \rightarrow$ Products

(i) If concentration of A is doubled, keeping conc. of B and C constant, the rate of reaction becomes double.

(ii) If concentration of B is halved keeping conc. of A and C constant, the rate of reaction remains unaffected

(iii) If concentration of C is made 1.5 times, the rate of reaction becomes 2.25 times

The order of reaction is

a) 1 b) 2.5 c) 3 d) 3.5

5] The rate of the reaction: $2NO + Cl_2 \rightarrow 2NOCl$ is given by the rate equation rate = $k[NO]^2[Cl_2]$. The value of the rate constant can be increased by

a) increasing the temperature

b) increasing the concentration of NO

c) increasing the concentration of the Cl_2

d) All of these

6] Which one of the following statements is incorrect about the molecularity of a reaction?

a) molecularity of a reaction is the number of molecules of the reactants present in the balanced equation

b) molecularity is a theoretical value

c) Molecularity is always a whole number

d) There is no difference between order and molecularity of a reaction

LIVEWORKSHEETS

7] Half – life period of a zero order reaction is

a) proportional to initial concentration of reactants

b) independent of initial concentration of reactants

c) inversely proportional to initial concentrations of reactants

d) inversely proportional to the square of initial concentration of reactants.

8] In the reaction, $2NO + Cl_2 \rightarrow 2NOCl$, it has been found that doubling the concentration of both the reactants increases the rate by a factor of eight but doubling the chlorine concentration alone only doubles the rate. Which of the following statements is incorrect?

a) The reaction is first order in Cl_2

b) the reactions second order in NO

c) The overall order of reaction is 2

d) The overall order of reaction is 3

9] The decomposition of a substance R takes place according to first order kinetics. Its initial concentration is reduced to $1/8^{th}$ in 24 s. The rate constant of the reaction is

a) $\frac{1}{24}s^{-1}$ b) $\frac{0.69}{16}s^{-1}$ c) $\frac{\ln 2}{8}s^{-1}$ d) $\frac{1}{8}s^{-1}$

10] the inversion of cane sugar proceeds with half – life of 500 minute at pH = 5 for any concentration of sugar. However, if pH = 6, the half – life changes to 50 minutes. The rate law expression for the sugar inversion can be written as

a) $r = k(sugar)^2 (H^+)^0$ b) $r = k(sugar)^1 (H^+)^0$

c) $r = k(sugar)^1(H^+)^1$ d) $r = k(sugar)^0(H^+)^1$

LIVEWORKSHEETS

11] For a first order reaction, A $\rightarrow$products, the rate of reaction at [A] = 0.2 M is 1.0×10^{-2} mol litre^{-1} min^{-1}. The half – life period for the reaction is

a) 832 s b) 440 s c) 416 s d) 14 s

12] The time taken for 90% of a first order reaction to complete is approximately

a) 1.1 times that of half – life b) 2.2 times that of half – life

c) 3.3 times that of half – life d) 4.4 times that of half – life

13] Which of the following represents the expression for 3/4th life of a first order reaction?

a) $\frac{k}{2.303}\log\frac{4}{3}$ b) $\frac{2.303}{k}\log\frac{3}{4}$

c) $\frac{2.303}{k}\log 4$ d) $\frac{2.303}{k}\log 3$

14] For a reaction pA + qB $\rightarrow$ products, the rate law expression is $r = k[A]^m[B]^n$, then

a) $(p + q) \neq (m + n)$ b) $(p + q) = (m + n)$

c) $(p + q)$ may or may not be equal to $(m + n)$ d) $(p + q) > (m + n)$

15] Which of the following statements is incorrect?

a) the catalyst does not effect the equilibrium of a reaction

b) Reaction with higher activation energy has higher rate constant

c) In an exothermic reaction, the activation energy of the reverse reaction is higher than that of the forward reaction.

d) Half – life period of a first order reaction is independent of initial concentration

LIVEWORKSHEETS

16] Which one of the following substances gives a positively charged sol?

a) Gold b) A metal sulphide c) Ferric hydroxide d) An acidic dye

17] Surface tension of hydrophilic sols is

a) Lower than water b) More than water

c) Equal to water d) None of these

18] Soap is sodium salt of higher fatty acids. When soap is added to water, the colloidal solution obtained contains ..... colloidal particles.

a) Positively charged b) Negatively charged

c) Neutral in nature d) Not ionised

19] Cottrell precipitator works on the principle of

a) Distribution law b) Addition of electrolytes

c) Le-Chatelier's principle d) Neutralisation of charge on colloids

20] Which of the following statements is not correct?

a) Physical adsorption is due to van der Waals' forces

b) Chemical adsorption decreases at high temperature and low pressure

c) Physical adsorption is reversible

d) Adsorption energy for a physical adsorption is generally greater than that of chemical adsorption.

LIVEWORKSHEETS

21] Brownian movement is due to

a) Temperature fluctuation within the liquid phase

b) Attraction and repulsion between charges on the colloidal particles

c) Impact of molecules of the dispersion medium on the colloidal particles

d) Convection currents

22] Which of the following statements is not correct?

a) Peptisation is the process by which certain substances are converted into the colloidal state when shaken in water containing a minute amount of an electrolyte.

b) Metal sols of gold, silver, platinum, etc. can be prepared by Bredig's arc method.

c) Impurities present in a sol make it more stable

d) Dialysis is a process with the help of which impurities present in a sol can be conveniently removed.

23] In the Freundlich adsorption equation $\frac{x}{m} = kP^{\frac{1}{n}}$, the value of n is

a) Always greater than one

b) Always smaller than one

c) Always equal to one

e) Greater than one at low temperature and is smaller than one at high temperature

LIVEWORKSHEETS

24] An equilibrium position in the process of adsorption _____.

a) $\Delta H > 0$ b) $\Delta H = T\Delta S$ c) $\Delta H > T\Delta S$ d) $\Delta H < T\Delta S$

25] Which of the following interface cannot be obtained?

a) liquid – liquid b) solid – liquid

c) liquid – gas d) gas – gas

26] . Which one of the following is not applicable to the phenomenon of adsorption?

a) $\Delta H > 0$ b) $\Delta G < 0$ c) $\Delta S < 0$ d) $\Delta H < 0$

27] Which of the following is an example of absorption?

a) Water on silica gel b) Water on calcium chloride

c) Hydrogen on finely divided nickel d) Oxygen on metal surface

28. Method by which lyophobic sol can be protected.

a) By addition of oppositely charged sol

b) By addition of an electrolyte

c) By addition of lyophilic sol

d) By boiling

29. Freshly prepared precipitate sometimes gets converted to colloidal solution by

a) coagulation b) electrolysis

c) diffusion d) peptisation

LIVEWORKSHEETS

30. Which of the following electrolytes will have maximum coagulating value for AgI/Ag^{+} sol ?

a) Na_2S b) Na_2SO_4 c) Na_3PO_4 d) NaCl

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LIVEWORKSHEETS