DPP

DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : CHEMISTRY
DPP No. : 7

Topic :- Chemical Kinetics

1 **(d)**

If $E_a = 0$, $k = Ae^{-E_a/RT} = Ae^0 = A$

Hence, k becomes independent of T

2 **(b)**

Larger is surface area, more is rate of reaction.

3 **(c)**

Reactions having lower energy of activation occurs more fast under similar experimental conditions.

4 **(b)**

For the first order reaction

$Rate\left(\frac{dx}{dt}\right) = k[A]$

[A]→concentration of reactant

K→rate constant

Given that,

$\frac{dx}{dt} = 1.5 \times 10^{-2} mol\ L^{-1} \text{min}^{-1}$

K=? and [A]=0.5 M

$1.5 \times 10^{-2} = k \times 0.5$

$k = \frac{1.5 \times 10^{-2}}{0.5} = 3 \times 10^{-3} \text{min}^{-1}$

For first order reaction,

Half-life period $t_{1/2} = \frac{0.693}{k} = \frac{0.693}{3 \times 10^{-2}}$

=23.1min

5 **(b)**

Temperature coefficient,

$= \frac{k_t + 10}{k_t}$

$2 = \frac{10^{-3}}{k_t}$

$k_t = \frac{10^{-3}}{2} = \frac{10 \times 10^{-4}}{2} = 5 \times 10^{-4}$

6 **(d)**

The minimum energy required by reaction molecules to undergo reaction is called activation energy.

7 **(c)**

For an nth order reaction

$$t_{1/2} \propto \frac{1}{a^{n-1}}$$

For 1st order reaction ,$t_{1/2} \propto \frac{1}{a^{1-1}} \propto a^0$

8 **(c)**

For every 10°C rise of temperature, rate is doubled. Thus, temperature coefficient of the reaction=2

When temperature is increased by 50°C, rate becomes

$=2^{50/10} = 2^5$ times=32 times

9 **(d)**

Order may or may not be equal to molecularity.

10 **(c)**

Use $r = K[A]^m[B]^n$

11 **(c)**

The reaction occurring in two steps has two activation energy peaks. The first step, being fast needs less activation energy. The second step being slow, needs more activation energy. Therefore, second peak will be higher than the first

13 **(d)**

$r_1 = K[A]^1$; $r_2 = K[A]^2, r_3 = K[A]^3$

if $[A] > t$; $r_3 > r_2 > r_1$

14 **(c)**

$$t = \frac{2.303}{k} log \frac{a}{(a-x)}$$

If $t = t_{1/4}$; $x = a/4$

$$\therefore t_{1/4} = \frac{2.303}{k} log \frac{a}{(a-1/4)}$$

$$\frac{2.303}{k} \log \frac{4}{3}$$

15 **(a)**

$K = Ae^{-E_a/RT}$

16 **(c)**

$100 \xrightarrow{2\ days} 50$

$50 \xrightarrow{4\ days} 25$

$25 \xrightarrow{8\ days} 12.5$

Hence, the order of reaction is second.

For second order reaction,

$$k = \frac{1}{2}\left[\frac{x}{a(a-x)}\right] = \frac{1}{2}\left[\frac{50}{100 \times 50}\right]$$

$$= \frac{1}{200}$$

$$t_{1/2} = \frac{1}{k.a}$$

$$\Rightarrow = \frac{1}{1/200.100}$$

$$= \frac{200}{100} = 2 days$$

17 **(b)**

$$\frac{1}{3}\frac{d[\mathrm{Br_2}]}{dt} = -\frac{1}{5}\frac{d[\mathrm{Br^-}]}{dt}$$

18 **(d)**

The reaction is said to be of second order if its reaction rate is determined by the variation of two concentration terms of reactants.

$CH_3COOCH_3 + NaOH \rightarrow CH_3COONa + H_2O$

Is an example of second order reaction.

19 **(b)**

Temperature coefficient is the ratio of two velocity constant having the difference of 10°C. For most of the reaction the value of temperature coefficient lies between 2 and 3

ANSWER-KEY										
Q.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
A.	**D**	**B**	**C**	**B**	**B**	**D**	**C**	**C**	**D**	**C**
Q.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
A.	**C**	**C**	**D**	**C**	**A**	**C**	**B**	**D**	**B**	**C**