DPP
DAILY PRACTICE PROBLEMS

Class : XIIth
Date :

Solutions

Subject : CHEMISTRY
DPP No. : 8

Topic :- Chemical Kinetics

1 **(c)**

$k = \frac{1}{t}\left[\frac{x}{a(a-x)}\right]$

$k = \frac{1}{500}\left[\frac{0.2a}{a(a-0.2a)}\right]$

$k = \frac{1}{2000a}$

$\frac{1}{2000a} = \frac{1}{t}\left[\frac{0.6a}{a(a-0.6a)}\right]$

$t = 3000$ s

2 **(a)**

K does not change with time; also unit of K suggest it to be II order.

3 **(d)**

Follow review of rate of reaction.

4 **(b)**

Molecularity represents the number of molecules of reactants taking part in an elementary step of reaction.

5 **(c)**

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

or $t_{1/2} = Z(a)^{1-n}$

or $\log_{t_{1/2}} = \log Z + (1-n)\log a$

or $y = c + mx$

Thus, slope $= m = 1 - n$ or $1 - n = 0 \ \therefore n = 1$

and for I order reaction $t_{1/2} = \frac{0.693}{K}$.

6 **(c)**

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

7 **(a)**

A pseudounimolecular reaction.

8 **(d)**

Rate becomes x^y times if concentration is made x time of a reactant giving y^{th} order reaction.

Rate =k$[A]^n[B]^m$

Concentration of A is doubled hence x=2 ,y=n and rate becomes = 2^n times

Concentration of B is halved ,hence x=$\frac{1}{2}$ and y=m and rate becomes=$\left(\frac{1}{2}\right)^m$ times

Net rate becomes=$(2)^n$ $\left(\frac{1}{2}\right)^m$times

=$(2)^{n-m}$times

9 **(d)**

For the reaction $H_2(g) + Br_2(g) \rightarrow 2HBr(g)$

Rate of reaction $= k[H_2][Br_2]^{1/2}$

Molecularity of reaction $= 1 + 1 = 2$

Order of reaction $= 1 + \frac{1}{2} = \frac{3}{2}$

10 **(c)**

When heat energy is supplied, kinetic energy of reactant molecules increase. This will increase the number of collisions and ultimately rate of reaction will be enhanced.

11 **(d)**

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

$$\therefore \quad K = \frac{2.303}{20}\log\frac{1}{0.25}$$

$$= 0.06931 \text{ min}^{-1}$$

12 **(d)**

I step of mechanism B shows I order in both reactants.

13 **(d)**

$K_a = Ae^{-E_a/RT}$ and $K_b = Ae^{-E_b/RT}$

Also, $K_a > K_b$

$E_a < E_b$

Now notice that all the given facts are satisfied.

14 **(c)**

Half-life depends upon rate constant and rate constant (K) varies with temperature as $K = A \cdot e^{-E_n/RT}$;K increase with temperature. Also $t_{1/2} \propto \frac{1}{K}$

15 **(d)**

$Rate = k[NOBr_2][NO]$ ...(i)

But $NOBr_2$is in equilibrium

$$k_{eq} = \frac{[NOBr_2]}{[NO][Br_2]}$$

$[NOBr_2] = k_{eq}[NO][Br_2]$ ...(ii)

Putting the $[NOBr_2]$ in (i)

$rate = k.k_{eq}[NO][Br_2][NO]$

Hence, $rate = k.k_{eq}[NO]^2[Br_2]$

$rate = k'[NO]^2[Br_2]$

where, k'.Keq
the order, of reaction with respect to NO(g) is 2

16 **(a)**

For zero order reaction, for example,

$A \rightarrow B$

$$\frac{-d[A]}{dt} = k[A]^0$$

$$\frac{-d[A]}{dt} = k$$

17 **(d)**

The increase in collision frequency brings in an increase in effective collisions and thus, rate of reaction increases.

18 **(a)**

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

When $n = 4$

$$t_{1/2} \propto \frac{1}{a^3}$$

Hence, order of reaction $= 4$

19 **(d)**

There are two different reactants (say A and B).

$A + B \rightarrow product$

Thus, it is a bimolecular reaction .

If $\frac{dx}{dt} = k[A][B]$

It is second order reaction

If $(\frac{dx}{dt}) = k[A]$

Or $=k[B]$

It is first order reaction .

Molecularity is independent of rate ,but is the sum of the reacting substance thus it cannot be unimolecular reaction .

20 **(a)**

rate $= K[A][B]^2$

$\therefore \quad 10^{-2} = K[1][1]^2$

or $\quad K = 10^{-2}$ litre^{2}mol^{-2}sec^{-1}

$\therefore \quad$ rate II $= 10^{-2}[0.5] \times [0.5]^2$

$= 1.2 \times 10^{-3}$mol/litre-sec

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