Nishant Jindal

O-I 42-47

S-I 23-35

O-II 1-4

43

$Rate = k[A]^1$

$6.930 \times 10^{-6} = k(0.01)$

$6.93 \times 10^{-4} = k$

$t = 50 \times 60 = 3000$

$$-\frac{d[A]}{dt} = k[A]_0 e^{-kt}$$

47

$H_2O_2 \longrightarrow H_2O + \frac{1}{2}O_2$

a 0

$a-x$ $x/2 \propto 5$ $x \propto 10$

0 $a/2 \propto 50$ $a \propto 100$

$$k = \frac{1}{20}\ln\frac{100}{90}$$

(29)

$$k_1 = \frac{1}{53} \ln \frac{100}{50}$$

$$\frac{600}{}$$

$$k_2 = \frac{1}{100} \ln \frac{100}{27}$$

$$2N_2O_5 \rightarrow 2N_2O_4 + O_2$$

(32)

time	30	∞
Pressure	284.5	584.5

$$2A \longrightarrow 4B + C$$

$(P_A)_0$		
$(P_A)_0 - x$	$2x$	$x/2$
0	$2(P_A)_0$	$(P_A)_0/2$

$$k_A = \frac{1}{t} \ln \frac{(P_A)_0}{(P_A)_0 - x}$$

$$k_R = \frac{k_A}{2}$$

Nishant Jindal

$$2A + B \longrightarrow$$

Nishant Jindal

35

$$k = \frac{1}{t} \ln \frac{42.03 - 19.24}{42.03 - 24.2}$$

0-II

20

$$k\underline{t} = 2\left(\sqrt{A_0} - \underline{\sqrt{A_t}}\right)$$

$$k t_{1/2} = 2\sqrt{A_0}\left(1 - \frac{1}{\sqrt{2}}\right)$$

$$k t_{3/4} = 2\sqrt{A_0}\left(1 - \frac{1}{2}\right)$$

Nishant Jindal

(3)

$$2A + B \longrightarrow C$$

$$\begin{array}{ccc} 2 & 1 & \\ 2-2x & 1-x & x \end{array}$$

$$\frac{d[C]}{dt} = \frac{dx}{dt} = k(2-2x)(1-x)^{-1}$$

$$\frac{dx}{dt} = 2k$$

$$[C] = \cancel{x} = 2kt$$

Nishant Jindal

(3) By optical rotation :→

$r \propto Cl$

$r = r^{\circ} C l$

specific rotation

Inversion of cane sugar

$C_{12}H_{22}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$

$S \longrightarrow G + F$

$r_s^{\circ} > 0 \qquad r_g^{\circ} > 0 \qquad r_f^{\circ} < 0$

$$k = \frac{1}{t} \ln \frac{[\text{Sucrose}]_0}{[\text{Sucrose}]_t} = \frac{1}{t} \ln \frac{a}{a-x}$$

Nishant Jindal

time	0	t	∞
Rotation	r_0	r_t	r_∞

$S \longrightarrow$	$G +$	F
		0
a	0	
$a-x$	x	x
0	a	a

$$\frac{a}{a-x} = \frac{r_\infty - r_0}{r_\infty - r_t}$$

$$\boxed{k = \frac{1}{t} \ln \frac{r_\infty - r_0}{r_\infty - r_t}}$$

$r_0 = r_s^\circ a$ — (1)

$r_t = r_s^\circ (a-x) + r_g^\circ x + r_f^\circ x$ — (2)

$r_\infty = r_g^\circ a + r_f^\circ a$ — (3)

by eq (3) − eq (1)

$r_\infty - r_0 = a(-r_s^\circ + r_g^\circ + r_f^\circ)$ — (4)

by eq (2)

$r_t - r_0 = x(-r_s^\circ + r_g^\circ + r_f^\circ)$ — (5)

$r_\infty - r_t = (a-x)(-r_s^\circ + r_g^\circ + r_f^\circ)$ — (6)

Nishant Jindal

1^{st} order parallel

$$A \xrightarrow{k_1} B$$

$$A \xrightarrow{k_2} C$$

$$A \begin{cases} \xrightarrow{k_1} B \quad y=[B] \\ \xrightarrow{k_2} C \quad z=[C] \end{cases}$$

a

$a-x$

$$x = y + z$$

$$\frac{dx}{dt} = \frac{dy}{dt} + \frac{dz}{dt}$$

$$-\frac{d[A]}{dt} = \frac{d[B]}{dt} + \frac{d[C]}{dt}$$

$$-\frac{d[A]}{dt} = (k_1 + k_2)[A]$$

$$[A]_t = [A]_0 e^{-(k_1+k_2)t}$$

$$k_{Total} = k_1 + k_2$$

$$t_{1/2} = \frac{\ln 2}{k_1+k_2}$$

$$-\frac{d[A]}{dt} = -\frac{d(a-x)}{dt} = \frac{dx}{dt}$$

$$\underbrace{\frac{d[B]}{dt} = k_1[A]} \qquad \underbrace{\frac{d[C]}{dt} = k_2[A]}$$

Nishant Jindal

$$\int_0^{[B]} d[B] = \int_0^t k_1 [A]\, dt$$

$$[B] = \int k_1 [A]_0 e^{-(k_1+k_2)t}\, dt$$

$$\boxed{[B] = \frac{k_1}{k_1+k_2} [A]_0 \left\{1 - e^{-(k_1+k_2)t}\right\}} = \frac{k_1}{k_1+k_2} x$$

$$\boxed{[C] = \frac{k_2}{k_1+k_2} [A]_0 \left\{1 - e^{-(k_1+k_2)t}\right\}} = \frac{k_2}{k_1+k_2} x$$

$$x = [A]_0 - [A]_t$$
$$= [A]_0 \left\{1 - e^{-(k_1+k_2)t}\right\}$$

$$\frac{[B]}{[C]} = \frac{k_1}{k_2}$$

$\frac{2}{3}$

$2/5 \times 100$

$3/5 \times 100$

$$A \xrightarrow{k_1} B \qquad \frac{k_1}{k_1+k_2} x$$
$$A \xrightarrow{k_2} C \qquad \frac{k_2}{k_1+k_2} x$$

(k_1+k_2)

1 mol

x

$$\frac{k_1}{k_1+k_2} \qquad \frac{k_2}{k_1+k_2}$$

Nishant Jindal

0-I 48 — 51

S-I 36 — 38

Nishant Jindal

Nishant Jindal

Nishant Jindal