Daily Tutorial Sheet-14	Level - 3

153.(C) For parallel reactions

$$E_a = \frac{k_1E_{a_1} + k_2E_{a_2}}{k_1 + k_2}$$

$$= \frac{10^{-2} \times 100 + 4 \times 10^{-2} \times 120}{10^{-2} + 4 \times 10^{-2}}$$

$$E_a = 116\,kJ/mol$$

154.(1) $\frac{R_2}{R_1} = 100 = \frac{k[H^+]_2^2}{k[H^+]_1^2}$; $\frac{[H^+]_2}{[H^+]_1} = 10$; pH decreased by 1 unit.

155.(B) Rate of the R×n. $= \frac{1}{n_1}\left[\frac{-d[A]}{dt}\right]$

$$k[A] = \frac{1}{n_1} - \left(\frac{d[A]}{dt}\right)$$

$$-n_1k[A] = \frac{d[A]}{dt}$$

$$\Rightarrow \quad \int \frac{d[A]}{[A]} = -n_1k\int dt$$

$$\ln[A] = -n_1kt + I$$

$$\Rightarrow \quad [A]_t = [A]_0e^{-n_1kt} \qquad [A]_0 = a.$$

156.(D) $n_1A \longrightarrow n_2B$

$t = 0$	a	0
(t)	$a - n_1x$	n_2x

Total moles of the gases at time *t*

$$= a_t + n_2x.$$

as $a - n_1x = a_t = ae^{-n_1kt}$

$$x = \frac{a}{n_1}\left[1 - e^{-n_1kt}\right]$$

& $n_2x = \frac{n_2}{n_1}a\left[1 - e^{-n_1kt}\right]$

$$\frac{v_t}{v_0} = \frac{n_t}{n_0} = \frac{a\left[e^{-n_1kt}\right] + \frac{n_2}{n_1}a\left[1 - e^{-n_1kt}\right]}{a}$$

$$\Rightarrow \quad v_t = v_0\left[\frac{n_2}{n_1} - \left(\frac{n_2}{n_1} - 1\right)e^{-n_1kt}\right]$$

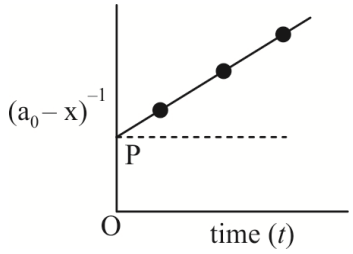
157.(A) $A \longrightarrow 2B$

For first order reaction

$[A] = [A_0]e^{-kt}$

158. A – 2, 6; B – 4, 5; C – 1; D – 3, 5

A – 2, 6

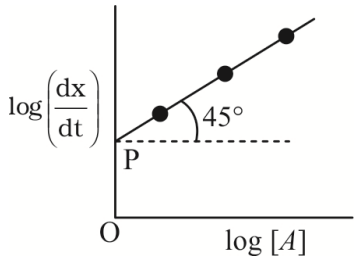


It represents second order reaction

OP = 0.5

$[A]_0 = 2$ Rate = $k[A]^2$

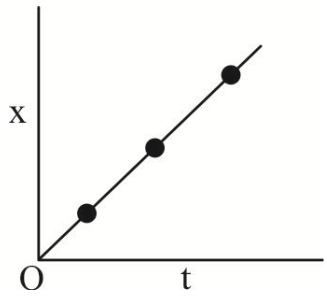
B – 4, 5



When OP = 0.301

k = 2

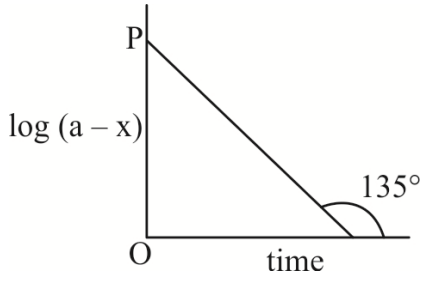
C – 1



Zero order reaction

Rate constant = rate of reaction

D – 3, 5



It represents first order reaction