

Daily Tutorial Sheet 5

Level – 1 | JEE Main

61.(A) Keeping [A] constant, doubling [B] increases rate of reaction two times. So, rate of reaction depends linearly on [B].

Similarly, keeping [B] constant, tripling [A] increases rate of reaction 9 times. So order with respect to [A] is 2. Overall order = 2 + 1 = 3.

62.(D) $\%B = \frac{k_1}{k_1 + k_2} \times 100 = \frac{12.6 \times 10^{-5}}{(12.6 + 3.8)10^{-5}} \times 100 = 76.83\%$, Therefore $\%C = 100 - 76.83 = 23.17\%$

63.(B) $r = k [A]^n$

$2.4 = k \times (2.2)^n$...**(i)** and $0.6 = k \times (1.1)^n$...**(ii)**

(i)/(ii) $\Rightarrow 4 = (2)^n \Rightarrow n = 2$

64.(A) Rate $\propto [A]^1[B]^{-1}$ net order of the reaction = 0.

65.(D) $r = k [A]^m [B]^n$

$r' = \frac{r}{4} = k[A]^m (2[B])^n \Rightarrow \frac{r}{r'} = 4 = \left(\frac{1}{2}\right)^n \Rightarrow n = -2$

66.(D) $r = k \times [A] \Rightarrow 2 \times 10^{-5} = k \times 0.01 \Rightarrow k = 2 \times 10^{-3}$

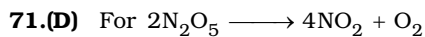
Half life, $t_{1/2} = \frac{0.693}{2 \times 10^{-3}} = \frac{693}{2} \text{ sec} \approx 347 \text{ sec}.$

67.(C) For IInd order reaction, unit of k is $\text{L mol}^{-1} \text{sec}^{-1}$ only

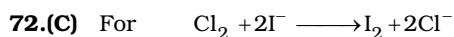
68.(A) Zero order reaction requires finite time to complete the reaction.

69.(D) $\frac{-d[B]}{dt} = 2 \times \left(\frac{-d[A]}{dt} \right) = 2 \times 5 \times 10^{-4} = 1 \times 10^{-3} \text{ mol L}^{-1} \text{s}^{-1}$

70.(C) $\frac{(t_{1/2})_1}{(t_{1/2})_2} = \left(\frac{a_2}{a_1} \right)^{n-1} \Rightarrow \frac{120}{240} = \left(\frac{4 \times 10^{-2}}{8 \times 10^{-2}} \right)^{n-1} \Rightarrow n = 1 = 1 \Rightarrow n = 2$



$-\frac{1}{2} \frac{d[\text{N}_2\text{O}_5]}{dt} = \frac{1}{4} \frac{d[\text{NO}_2]}{dt} = \frac{d[\text{O}_2]}{dt}$



$r = k[\text{I}^-]^2 = 2.5 \times 10^{-2} \times (0.2)^2 = 2.5 \times 0.04 \times 10^{-2} = 1 \times 10^{-3} \text{ mol / L sec}$

But $\frac{d[\text{I}_2]}{dt} = r = 1 \times 10^{-3}$



$-\frac{1}{3} \frac{d[\text{A}]}{dt} = \frac{1}{2} \frac{d[\text{B}]}{dt}$

$\frac{d[\text{B}]}{dt} = \frac{2}{3} \left(\frac{-d[\text{A}]}{dt} \right)$

74.(B) $\frac{d[\text{NH}_3]}{dt} = \frac{2}{3} \left(\frac{-d[\text{H}_2]}{dt} \right) = \frac{2}{3} \times 0.3 \times 10^{-4} = 0.2 \times 10^{-4} \text{ M / s}.$

$$75.(D) \quad r = k [\text{SO}_2]^2 [\text{O}_2] = k \times \left(\frac{n_{\text{SO}_2}}{V} \right)^2 \left(\frac{n_{\text{O}_2}}{V} \right) = \frac{k \times n_{\text{SO}_2}^2 \times n_{\text{O}_2}}{V^3}$$

$$r' = \frac{k n_{\text{SO}_2}^2 n_{\text{O}_2}}{(2V)^3}$$

$$r : r' = 8 : 1.$$