

Suprasup3

Kinetics ① Rate of Reaction and Stoichiometry.

① Consider the reaction $A + 2B \rightarrow 3C + 2D$.
 * Suppose at one point in the reaction, $[A]$ is 0.4658M and 125s later $[A] = 0.4282\text{M}$.

- ⓐ what is the rate expression?
 ⓑ what is the rate of formation of C ?

$$\text{ⓐ} \quad \frac{[A]_f - [A]_i}{\Delta t} = \frac{(0.4282 - 0.4658)\text{M}}{125\text{s}} = \boxed{3.01 \times 10^{-4} \text{ M/s}}$$

$$\text{ⓑ} \quad \text{Rate of formation of } C = \frac{3 \text{ mol } C}{1 \text{ mol } A} \times 3.01 \times 10^{-4} \text{ M/s} \\ = \boxed{9.03 \times 10^{-4} \text{ M/s}}$$

② Consider the reaction $2A + B \rightarrow 2C + D$.
 * At some point conc. of $[D] = 0.2885\text{M}$ and after 2.55mins ($2\text{mins } 33\text{sec}$) $[D] = 0.3546\text{M}$.

- ⓐ what is the average rate of reaction during this time?
 ⓑ what is the rate of formation of C ?

$$\text{ⓐ} \quad \frac{[D]_f - [D]_i}{\Delta t} = \frac{(0.3546 - 0.2885)\text{M}}{2.55 \text{ mins}} = \boxed{0.0259 \text{ M/min}}$$

$$\text{ⓑ} \quad \frac{2C}{1D} \times 0.0259 \text{ M/min} = \cancel{8.63 \times 10^{-2}} \\ = \boxed{0.0518 \text{ M/min}}$$