ES.1 (ES CINETICA)

$$v_0 = k[F_2]_0^a \cdot [ClO_2]_0^b$$

$$= k[F_2]_0^a \cdot (4[ClO_2]_0)^b$$

$$4v_0 = k[F_2]_0^a \cdot (4[ClO_2]_0)^b$$

$$\frac{v_0 = k[F_2]_0^a \cdot [ClO_2]_0^b}{4 = 4^b \qquad b = 1}$$

ORDINE DI REAZIONE RISPETTO ClO_2

$$v_0 = k(2[F_2]_0)^a \cdot (ClO_2)^b$$

$$v_0 = k[F_2]_0^a \cdot [ClO_2]^b$$

$$2 = 2^a \qquad a = 1$$

ORDINE DI REAZIONE RISPETTO F_2

$$v = k[F_2][ClO_2]$$

ORDINE TOT DI REAZIONE $1+1=2$

$$2{,}7 \cdot 10^{-3} = k(0{,}15)(0{,}015)$$

$$k = \frac{2{,}7 \cdot 10^{-3}}{0{,}15 \cdot 0{,}015} = 1{,}2\ \ell\ mol^{-1}\ s$$

ES.2

$$v = -\frac{d[^3H]}{dt} = k[^3H] \qquad v = -\frac{d[^3H]}{[^3H]} = k\,dt$$

$$\ln\frac{[^3H]}{[^3H]_0} = -kt$$

$$\ln\frac{1}{2} = -kt_{1/2}$$

$-\ln 2$

$$k = \frac{\ln 2}{t_{1/2}} = 0{,}0548\ ami^{-1}$$

12 ami

$$\ln\frac{10}{100} = -0{,}0548\ ami^{-1} \cdot t$$

$$t = -\frac{\ln 0{,}1}{0{,}0548\ ami^{-1}} = 39{,}8\ ami$$

N° 3

$$k = A \cdot e^{-\frac{Ea}{R \cdot T}}$$

$$\ln \frac{K1}{K2} = \frac{Ea}{R}\left(\frac{1}{T2} - \frac{1}{T1}\right)$$

$$\ln\left(\frac{9,51 \cdot 10^{-9}}{1,10 \cdot 10^{-5}}\right) = \frac{Ea}{8,314}\left(\frac{1}{600} - \frac{1}{500}\right)$$

$$Ea = -\frac{-4,05 \cdot 8,314}{-0,000333} = 1,176 \cdot 10^{5}\ J/mol$$

$$A = \frac{k}{e^{-Ea/R \cdot T}} = \frac{9,51 \cdot 10^{-9}}{e^{-1,176/8,314 \cdot 500}} = 2,37 \cdot 10^{10}\ \frac{l}{mol \cdot s}$$

N° 4

$$v_0 = k [A]_0^a \cdot [B]_0^b$$

① $[A] \Rightarrow 2[A_0] \Rightarrow v \rightarrow 2v_0$

$$2v_0 = k([A_0] \cdot 2)^a \cdot [B]_0^b$$

$$\frac{v_0 = k [A_0]^a \cdot [B]_0^b}{2 = 2^a \quad a = 1}$$

② $[B] \rightarrow 2[B_0] \Rightarrow v \rightarrow 4v_0$

$$4v_0 = k [A]_0^a \cdot (2[B]_0)^b$$

$$\frac{v_0 = k [A]_0^a \cdot [B]_0^b}{4 = 2^b \quad b = 2}$$

$$v = k [A] \cdot [B]^2$$

$$0,03 = k(1,5)(1,0)^2 \qquad k = \frac{0,03}{1,5 \cdot 1,0^2} = 0,02\ l^2 mol^{-2} s^{-1}$$

N° 5

$t_{1/2} = \frac{0{,}693}{K} = \frac{0{,}693}{8{,}7 \cdot 10^{-3}} = 79{,}7\,\text{s}$

$\ln \frac{[A]_0}{[A]} = K \cdot t \qquad \ln[A_0] - \ln[A] = K \cdot t$

0-30' → 0-1800 s

$[A]_0 \rightarrow 1\,\text{kg} \rightarrow 1000\,\text{g}$

$\ln[A] = \ln[A_0] - Kt = \ln(1000) - 8{,}7 \cdot 10^{-3} \cdot 1800 = -8{,}75$

$[A] = e^{-8{,}75} = 1{,}6 \cdot 10^{-4}\,\text{g}$