

147.(D) For the given reaction.

$$-\frac{1}{3} \frac{\Delta[\text{BrO}^-]}{\Delta t} = \frac{\Delta[\text{BrO}_3^-]}{\Delta t} = +\frac{1}{2} \frac{\Delta[\text{Br}^-]}{\Delta t}$$

Given, $\frac{\Delta[\text{BrO}^-]}{\Delta t} = 0.056 \text{ L mol}^{-1} \text{ s}^{-1} [\text{BrO}^-]^2$ (being second order reaction)

(a) $\frac{\Delta[\text{BrO}_3^-]}{\Delta t} = -\frac{1}{3} \frac{\Delta[\text{BrO}^-]}{\Delta t} = \frac{0.056}{3} = 0.019 \text{ L mol}^{-1} \text{ s}^{-1}$

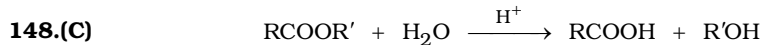
Thus, true

(b) $\frac{\Delta[\text{Br}^-]}{\Delta t} = \frac{2}{3} \left[-\frac{\Delta[\text{BrO}^-]}{\Delta t} \right] = \frac{2}{3} \times 0.056 = 0.037 \text{ mol L}^{-1} \text{ s}^{-1}$

Thus, true

(c) $-\frac{\Delta[\text{BrO}^-]}{\Delta t} = k[\text{BrO}^-]^2 = 0.056(5)^2 = 0.056 \text{ mol L}^{-1} \text{ s}^{-1}$

Thus, true



at $t = 0$: a 0 0

at time t : (a - x) x x

at time ∞ : (a - a) a a

at $t = 0$, V_0 = volume of NaOH due to H^+ (catalyst)

$$V_t = x + V_0$$

$$V_\infty = a + V_0$$

If ester is 50% hydrolysed then $x = \frac{a}{2}$

$$V_t = \frac{a}{2} + V_0$$

$$a = 2V_t - 2V_0$$

$$\therefore V_\infty = 2V_t - 2V_0 + V_0 = 2V_t - V_0$$

149.(B) $\left(\frac{dx}{dt} \right) = k[A]^n$

$$\log \left(\frac{dx}{dt} \right) = n \log[A_0] + \log k$$

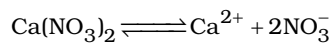
Thus, $n = \text{slope} = \text{order}$

Greater the order, larger the slope.

Thus, P = 3, Q = 2, R = 1, S = 0

150.(B) by Raoult's law.

$$\frac{\Delta P}{P^\circ} = X_{\text{solute}}$$



$$\therefore i = [1 + (y - 1)x] = (1 + 2x)$$

$$X_{\text{solute}} = \frac{0.04i}{0.04i + 4} = \left(\frac{0.01i}{0.01i + 1} \right)$$

$$\frac{760 - 741}{760} = \frac{0.01i}{0.01i + 1}$$

$$\frac{1}{40} = \frac{0.01i}{0.01i + 1}$$

$$0.01i + 1 = 0.4i$$

$$i = 2.56$$

Van't Hoff factor of solute is to be included in total mole well as in individual solute.

151.(C) $\text{A} \longrightarrow \text{B} + \text{C}$

$$(t = 0) 100 \quad 0 \quad 0$$

$$(t = 10\text{min}) 100 - p \quad p \quad p$$

$$(\text{given}) \quad 100 + p = 120, \quad p = 20$$

$$k = \frac{2.303}{10} \log \frac{100}{(100 - p)} = \frac{2.303}{10} \log \frac{100}{80}$$

152.(C) $[\text{H}^+]_{\text{W.A}} = 10^{-3} [\text{H}^+]_{\text{S.A}} = 10^{-3} \text{M}$

$$K_a = \frac{C\alpha^2}{1 - \alpha}$$

$$= \frac{1 \times (10^{-3})^2}{1 - 10^{-3}} = 10^{-6}$$