$\boxed{4.1}$

$$\frac{t}{V/A} = K_1 \frac{V}{A} + K_2$$

$$K_1 = \frac{\mu \alpha \rho_c}{2\Delta P} \qquad K_2 = \frac{\mu R_m}{\Delta P}$$

$$K_1 = 0.18 \frac{\text{min}}{\text{cm}^2} \frac{60\text{s}}{\text{min}} = 10.8\ \text{s/cm}^2$$

$$K_2 = 0.017 \frac{\text{min}}{\text{cm}} \frac{60\text{s}}{\text{min}} = 1.02\ \text{s/cm}$$

$$\mu = 2\text{cp} = 0.02\ \text{g/scm}$$

$$\rho_c = 13\text{g/L} = 0.013\ \text{g/cm}^3$$

$$\Delta P = 610\ \text{mmHg} \times \frac{14.7\ \text{psi}}{760\ \text{mmHg}} \times \frac{69000\ \text{g/cms}^2}{\text{psi}} = 814100\ \text{g/cms}^2$$

$$\alpha = \left(\frac{10.8\text{s}}{\text{cm}^2}\right)(2)\left(814100 \frac{\text{g}}{\text{cms}^2}\right)\left(\frac{\text{scm}}{0.02\text{g}}\right)\left(\frac{\text{cm}^3}{0.013\text{g}}\right)$$

$$\underline{\underline{\alpha = 6.76 \times 10^{10}\ \text{cm/g}}} \qquad (6.76 \times 10^{11}\ \text{m/Kg})$$

$$R_m = \left(1.02 \frac{\text{s}}{\text{cm}}\right)\left(814100 \frac{\text{g}}{\text{cms}^2}\right)\left(\frac{\text{scm}}{0.02\text{g}}\right)$$

$$\underline{\underline{R_m = 4.15 \times 10^{7}\ \text{cm}^{-1}}} \qquad (4.15 \times 10^{9}\ \text{m}^{-1})$$

AFTER 5 MINUTES (300 s)

$$\frac{300}{V/A} = 10.8\left(\frac{V}{A}\right) + 1.02$$

let $x = \frac{V}{A}$

$$300 = 10.8x^2 + 1.02x$$

$$0 = 10.8x^2 + 1.02x - 300$$

$$x = \frac{-1.02 \pm \sqrt{(1.02)^2 + (4)(300)(10.8)}}{2(10.8)}$$

$$x = \frac{-1.02 \pm 113.85}{21.6} \Rightarrow 5.22$$

SO $\quad x = \frac{V}{A} = 5.22$

$$R_c = \alpha \rho_c \frac{V}{A} = \left(6.76\times10^{10}\ \frac{cm}{g}\right)\left(\frac{0.013g}{cm^3}\right)\left(5.22cm\right)$$

$$R_c = 4.59\times10^{9}\ cm^{-1}$$

$$R_m = 4.15\times10^{7}\ cm^{-1}$$

AFTER 5 MINUTES,
FRACTIONAL SIGNIFICANCE OF $R_m \Rightarrow \frac{R_m}{R_c+R_m} =$

$$= \frac{4.15}{459+4.15} = \underline{\underline{0.009}} \qquad \text{(less than 1\%)}$$