OFFICE HOURS 4/18/2018

Problem 3

90% → Because 90% is released (1)

≈ 0.1

Situation 1

$$\ln \frac{C_{avg}(t) - C_s}{C_i - C_s} = \ln\left[\frac{8}{\pi^2}\right] - D\left(\frac{\pi}{2R}\right)^2 t$$

$C_i - C_s$ → constant.

t → time does not change.

What is changing? $\rightarrow D\left(\frac{\pi}{2R}\right)^2 t$

$$\text{Concentration} = \frac{\text{g of drug}}{\text{total g.}} \times 100$$

$$\text{Concentration} = \frac{\text{g of drug}}{\text{g of resin.}} \times 100$$

Situation 2 $\quad R_2 = \frac{R}{\sqrt{2}} \quad D_2 = \frac{D}{2}$

Situation 1 $\quad D\left(\frac{\pi}{2R}\right)^2 \rightarrow$ Situation 2 $\quad \frac{D}{2}\left(\frac{\pi}{2\frac{R}{\sqrt{2}}}\right)^2 = \frac{D}{2}\left(\frac{\pi}{2R}\right)^2$

Problem 4

radius [m]

$$M_{water} = NR = N \frac{\text{rev}}{\text{min}} \times \frac{1\,\text{min}}{60\,\text{s}} \times \frac{2\pi\,\text{radian}}{1\,\text{rev}} \times R_m$$

N → rpm

$$M_{water} = \frac{2\pi N R}{60} \left[\text{m/s}\right]$$

$$Sh_L = 0.664\, Re_L^{1/2}\, Sc^{1/3}$$

$$Re_L = \frac{L \times S \times \mu}{\mu}$$

$$Sh_{L1} = 0.664 \left(\frac{L S \mu_1}{\mu}\right)^{1/2} Sc^{1/3}$$

$$Sh_{L2} = 0.664 \left[\frac{L S \mu_2}{\mu}\right]^{1/2} Sc^{1/3}$$

Assuming all are laminar flow

$$\frac{Sh_{L2}}{Sh_{L1}} = \left(\frac{\mu_2}{\mu_1}\right)^{1/2} = \frac{\frac{h_{m2} L}{D_{AB}}}{\frac{h_{m1} L}{D_{AB}}} = \frac{h_{m2}}{h_{m1}}$$

→ Equation holds if all flow regime over the tablet are laminar