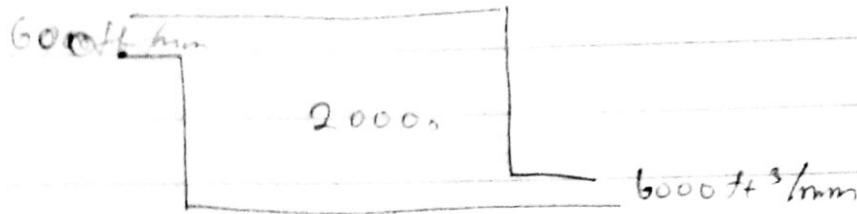


Finans Ungaraji Abraham

16/02/2021

Electrical Electronics Engineering

ENR 282 Assignment



$$\frac{dy}{dt} = \frac{y_{in} - y_{out}}{y_{in} = 600}$$

$$y_{out} = \frac{600}{20000}$$

$$\frac{dy}{dt} = 600 - 0.02y$$

$$\frac{dy}{dt} = -0.03(y - 20000)$$

$$\int \frac{dy}{(y - 20000)} = \int -0.03 dt$$

$$\textcircled{a} \ln(y - 20000) = -0.03 t + C$$

$$y - 20000 = y_0 e^{-0.03 t}$$

$$\textcircled{a} y = y_0 e^{-0.03 t} + 20000$$

$$y_0 = -20000$$

$$\textcircled{b} 90\% \times 20000 = 18000$$

$$y = 18000$$

$$18000 = 20000 e^{-0.03 t} + 20000$$

$$18000 - 20000 = -20000 e^{-0.03 t}$$

$$0.1 = e^{-0.03 t}$$

$$\ln(0.1) = -0.03 t$$

$$t = \frac{-2.301}{-0.03}$$

$$t = 76.8 \text{ minutes}$$