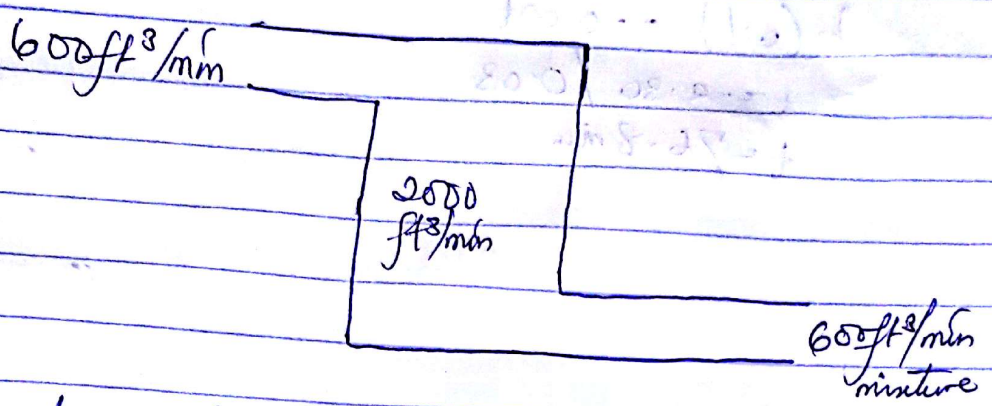
PAM-DUSH M. TRUMAN
MECHANICAL ENGINEERING
16/ENG06/067
ENG282 AAA.

ANSWER.



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

$$y_{in} = 600$$

$$y_{out} = \frac{600}{2000} = 0.03y$$

$$\frac{2y}{2t} = 600 - 0.03y$$

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

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

$$\ln|y = 20000| = -0.03t + c$$

$$y - 20000 = e^{-0.03t + c}$$

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

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

$t = t = 0$; $y = 0$

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

$$0 = y_0 e^{-0.03(0)} + 20000$$

$$y_0 = -20000$$

$$y = -20000 e^{-0.03t} + 2000 \quad \ldots \text{Model}$$

b) $90\% \times 20000 = 18'000$

$y = 18'000$

$18'000 = -20000 e^{-0.03t} + 20000$

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

$0.1 = e^{-0.03t}$

$\ln(0.1) = -0.03t$

$t = -2.30 / 0.03$

$t = 76.8 \text{ min}$