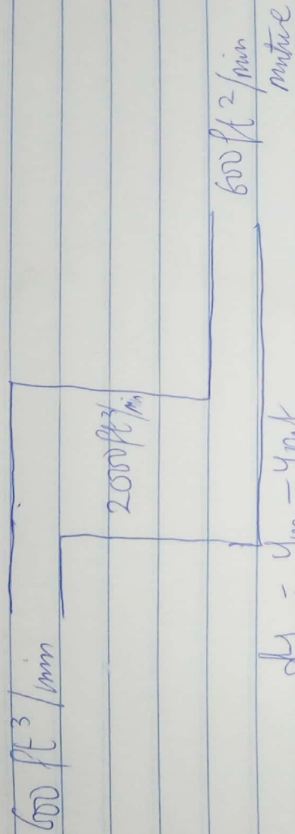


ONYEKA HENRY CHINEME  
 16 ENGO4 045  
 ELECT/ELECT

Answer



$$y_{in} = 600$$

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

$$\frac{dy}{dt} = 600 - 0.03y$$

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

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

$$\ln(y - 20000) = -0.03t + C$$

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

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

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

At  $t=0, y=0$

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

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

$$y_0 = -20000$$

$$18000 = 0 - 20000e^{-0.03t} + 20000$$

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

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

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

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

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GRAPH OF DYNAMIC RESPONSE OF THE AMOUNT OF FRESH AIR

