

ANYOHA VALENTINE · 0 ·  
16/ENG 006/014  
MECHANICAL ENGINEERING  
ENG 282

Answer

a)  $\frac{dy}{dt} = ky$

$$\int \frac{1}{y} dy = \int k dt$$

$$\ln y = kt + C$$

$$y = e^{kt+C}$$

$$y = e^{kt} \cdot e^C$$

Let  $e^C = y_0$

$$y = y_0 \cdot e^{kt}$$

But  $y = dy_0$  and  $t = 5 \text{ hrs}$

$$dy_0 = y_0 \cdot e^{5k}$$

$$\ln d = 5k$$

$$k = \frac{\ln d}{5} = \frac{\ln 2}{5} = 0.139$$

$$y = y_0 e^{0.139t}$$

b) 24 hours = 1 day

$$2e = 1 \frac{1}{2} \text{ day}$$

$$2e = 24 \times 1.5 = 36 \text{ hrs}$$

Where  $y_0 = 20$  and  $t = 36$

$$y = 20 e^{0.139 \times 36}$$

$$y = 2980.2$$