PAM-DUBU M. TRUMAN
16/ENG06/067
MECHANICAL ENGINEERING.

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 $y = 2y_0$ and $t = 5hrs$

$2y_0 = y_0 \cdot e^{5k}$

$\ln 2 = 5k$

$k = \frac{\ln 2y_0 / y_0}{5} = \frac{\ln 2}{5} = 0.139$

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

b) 24hrs = 1 day

$x = 1\frac{1}{2}$ day

$x = 24 \times 1.5 = 36hrs$

when $y_0 = 20$ and $t = 36$

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

$y = 2980.8$.