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18/Eng06/015

Mechanical Engineering

Eng 282

i) $y = y_0 e^{kt}$

$y = 3y_0, \quad y/y_0 = 3$

ii) $\frac{y}{y_0} = e^{kt} = 3$ at $t = 9$

iii) $\frac{y}{y_0} = e^{kt} = 9$ at $t = 18$

$\therefore y_0 = 50 \dots \text{--- (i)}$

$y_0 = 150 \dots \text{--- (ii)}$

$\therefore y = 50 e^{kt} \dots \text{--- (iii)}$

$y = 150 e^{kt} \dots \text{--- (iv)}$

iii) $3 = e^{kt}$

$\ln 3 = kt$

$\ln 3 = 9k$

$k = \frac{\ln 3}{9}$

$k = 0.122H$

iv) $9 = e^{kt}$

$\ln 9 = 18k$

$\ln 9/18 = k$

$k = 0.122$

$y = 50e^{0.122t}$
 $y = 150e^{0.122t}$

$$I = 0.1 \cdot 10 = 1$$

$$A(t) = 50 \cdot \exp(0.12t) - 0$$

$$B(t) = 150 \cdot \exp(0.12t) - 0$$

A(t) =

50
56.488
63.817
72.088
81.453
92.022
103.962
117.453
132.663
149.908
169.390
191.354
216.193
244.398
276.565
311.895
352.354
398.073
449.725
508.078
574.003
648.483
732.526
827.487
935.003

B(t) =

150
169.463
191.452
216.293
244.398
276.565
311.895
352.354
398.073
449.725
508.078
574.003
648.483
732.526
827.487
935.003

