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 1616051029  
 MECHATRONICS  
 MATHS  
 EUG 2.82

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

$$y = 3y_0$$

$$\therefore \frac{y}{y_0} = 3$$

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

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

$$\therefore \frac{a}{b} \frac{y}{y_0} = \frac{3}{9} = \frac{1}{3}$$

$$\frac{1}{3} = \frac{e^{9k}}{e^{18k}} = e^{-9k}$$

$$\ln \frac{1}{3} = \ln e^{-9k}$$

$$\ln \frac{1}{3} = -9k$$

$$k = \frac{\ln \frac{1}{3}}{-9} = \frac{\ln 3}{9}$$

$$h = 0.122$$

$$q = e^{kt}$$

$$\ln q = \ln e^{kt} = kt$$

$$\ln 9 = 18h$$

$$\frac{\ln 9}{18} = h$$

$$h = 0.122$$

$$\therefore y = 50 e^{0.122t} \dots (a)$$

$$\therefore y = 150 e^{0.122t} \dots (b)$$

