

AMADI-DURU, C. Melvin

18/ENGO4/013

$$\frac{dT}{dt} = k(T-25)$$

$$\frac{dT}{T-25} = k dt$$

$$\ln(T-25) = kt + C$$

$$T-25 = e^{kt+C}$$

$$T-25 = e^{kt} T_0$$

$$T = T_0 e^{kt} + 25$$

when $t=0$

$$10 = T_0 e^{2(0)} + 25$$

$$10 = T_0 \times 1 + 25$$

$$T_0 = 10 - 25 = -15$$

hence

$$T = -15e^{kt} + 25$$

for 5 min

$$T = 20, k = ?$$

$$20 = -15e^{kt} + 25$$

$$20 - 25 = -15e^{kt}$$

$$-5 = -15e^{kt}$$

$$0.33 = e^{kt}$$

$$-1.108 = e^{5k}$$

$$k = -0.219$$

hence

$$T = -15e^{-0.219t} + 25$$

$$T = 24.9^\circ\text{C}$$

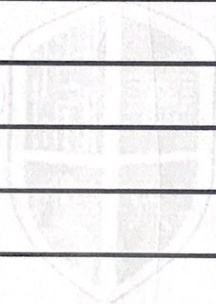
$$24.9 = -15e^{-0.219t} + 25$$

$$-0.1 = -15e^{-0.219t}$$

$$6.67 \times 10^{-3} = e^{-0.219t}$$

$$-5.011 = -0.219t$$

$$t = 22.88 \approx 23^\circ\text{C}$$



N.U.E.S.A.

ABUJAH ENGINEERING

