

Opeyemi



Opeyemi

$$T_0 = 10^\circ\text{C}, T_1 = 20^\circ\text{C}$$

$$t = 5 \text{ mins} = 300 \text{ sec}, T_a = 25^\circ$$

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

$$dT = k dt (T - T_a)$$

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

$(T - T_a)$

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

$$T - 25 = e^{kt} \cdot e^C$$

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

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

a)  $T = 10^\circ\text{C}, t = 0$

$$10 = A e^0 - 25$$

$$A = 35$$

$$T = 35 e^{kt} - 25$$

a)  $T = 20^\circ\text{C}, t = 5 \text{ mins} = 300 \text{ sec}$

$$20^\circ\text{C} = 35 e^{300k} - 25$$

$$45 = 35 e^{300k}$$

$$e^{300k} = \frac{45}{35}$$

Opeyemi



Opeyemi

$$e^{300k} = 1.2857$$

$$300k = \ln 1.2857$$

$$k = \frac{\ln 1.2857}{300} = 0.0008377$$

$$T = 35 e^{0.0008377t} - 25$$

$$T = 24.9 \quad \text{if } t = ?$$

$$24.9 = 35 e^{0.0008377t} - 25$$

$$49.9 = 35 e^{0.0008377t}$$

$$e^{0.0008377t} = \frac{49.9}{35}$$

$$e^{0.0008377t} = 1.4257$$

$$0.0008377t = \ln 1.4257$$

$$t = \frac{\ln 1.4257}{0.0008377} = 423.37 \text{ seconds}$$

```
ATLAB
Editor - C:\Users\yimat\Documents\MATLAB\yimaquiz2.m
yimaquiz2.m x +
- commandwindow
- clear
- clc
- close all
- format short g
- mdata=xlsread('onlinequizdata','fluiddata')
- x=mdata(1:2:250,1)
- y=mdata(1:2:250,2)
- plot(x,y)
- grid on
- grid minor

Command Window
86
88
90
92
94
96
98
100
fx 102

script Ln 11 Col 11
```

