

Handing - Udoh Titania B.
18/05/2018/009
BIOMEDICAL ENGINEERING.

Initial Temp = 10°C
2nd Temp = 20°C @ 5min
actual Temp = 25°C .

$$\frac{dT}{dt} \propto (T - T_a) \quad T_a = \text{actual temp}$$

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

collecting like terms.

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

$$\ln(T-25) = t/k + c$$

$$T-25 = e^{t/k + c}$$

$$T-25 = e^{t/k} \cdot e^c \quad \text{where } e^c = A$$

$$T-25 = A e^{t/k}$$

$$T = A e^{t/k} - 25$$

at initial $t=0$ $T=10^{\circ}\text{C}$.

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

$$A = 35$$

$$\therefore T = 35 e^{t/k} - 25$$

at $T = 25^{\circ}\text{C}$ $t = 5 \text{ mins}$

$$20^{\circ} = 35e^{5k} - 25$$

$$45 = 35e^{5k}$$

$$e^{5k} = 45/35$$

$$5k = \ln(45/35)$$

$$k = 0.251$$

$$\frac{1}{5}$$

$$k = 0.05$$

$$T = 35e^{0.05t} - 25$$

① $T = 49.9$ at $t = ?$

$$49.9 = 35e^{0.05t} - 25$$

or

$$49.9 + 25 = 35e^{0.05t}$$

$$74.9 = 35e^{0.05t}$$

$$e^{0.05t} = 74.9/35$$

$$e^{0.05t} = \ln(2.1426)$$

$$0.05t = 0.3548$$

$$t = \frac{0.3548}{0.05}$$

$$t = 7.09 \approx 7.1$$

$$t = 7 \text{ mins } \& \text{ second}$$

```
Y:\maquiz2.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
102
```

script Ln 11 Col 11

