

NAME:

Charles-Ornum Adam

DEPT:

Civil Engineering

MAT NO:

18/ENGO3/023

Initial = 10°C

T = 20°C

at 5 mins

T actual = 25°C

$\frac{dT}{dt} \propto (T - T_A)$

∴ T_A = Actual temperature

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

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

Collecting like terms

$\frac{dT}{(T - 25)}$

= k dt

By integrating both sides ∫ = ∫

ln(T - 25) = kt + C

T - 25 = e^{kt + C}

where e^C = A

T - 25 = e^{kt} × e^C

$$T - 25 = Ae^{kt}$$

$$T = Ae^{kt} - 25$$

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

$$10 = Ae^0 - 25$$

$$A = 35$$

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

$$t = 5 \text{ mins.}$$

$$T = 20^\circ\text{C}$$

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

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

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

$$5k = \ln\left(\frac{45}{35}\right)$$

$$k = \frac{0.251}{5}$$

$$k = 0.05$$

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

$$T = 24.9$$

$$t = ?$$

$$24.9 = 35e^{0.05t} - 25$$

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

$$e^{0.05t} = \frac{49.9}{35}$$

$$e^{0.05t} = \ln(1.43)$$

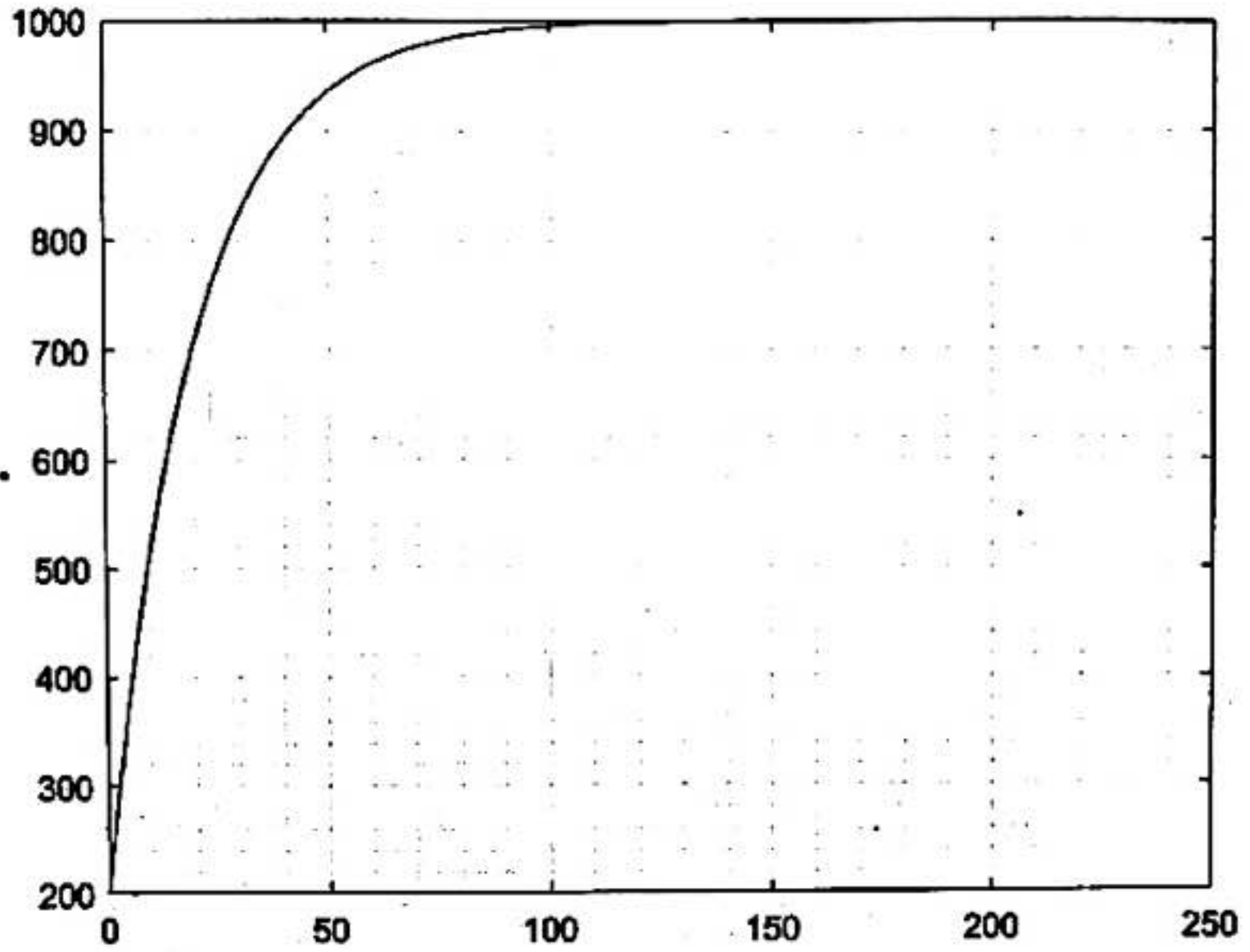
$$0.05t = 0.36$$

$$t = \underline{\underline{7.2}}$$

Figure 1



File Edit View Insert Tools Desktop Window Help



quiz2.m

```
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
```

I

Command Window

```
00  
08  
90  
92  
94  
96  
98  
100  
102
```