

```
- 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

86
88
90
92
94
96
98
100
102

script

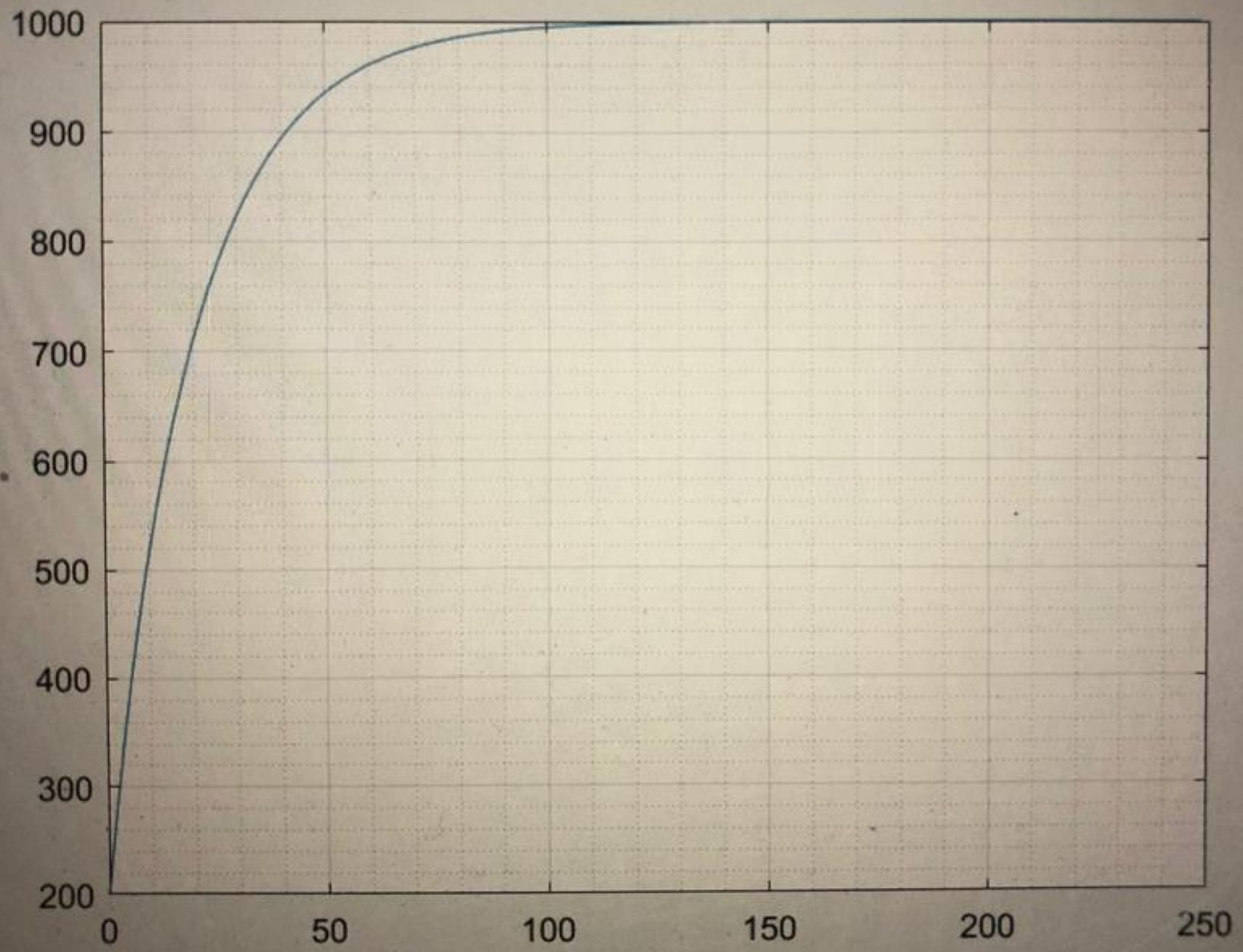
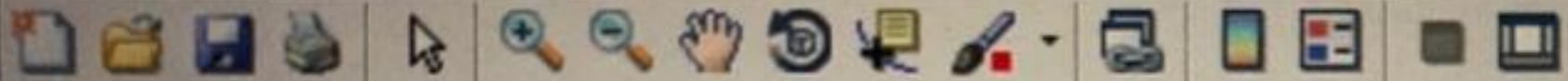
Ln 11 Col 11

EDITOR

Figure 1



File Edit View Insert Tools Desktop Window Help



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USMAN HABIBA LADEU

18/ENG081025

Biomedical Engineering

Question 1

$$T = 10^{\circ}\text{C}$$

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

5 mins

$$T_{\text{actual}} = 25^{\circ}\text{C}$$

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

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

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

collecting like terms

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

Integrating both sides

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

$$\therefore T - 25 = e^{tk} + C$$

where $e^C = A$

$$T - 25 = e^{tk} = e^C$$

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

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

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

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

$$A = 35$$

$$\therefore T = 35 e^{tk} - 25$$

at $T = 20^{\circ}\text{C}$ $t = 5 \text{ mins}$

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

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

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

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

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

$$k = 0.05$$

5

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

$$T = 24.9 \text{ at } t = ?$$

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

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

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

$$e^{0.05t} = \ln(1.426)$$

$$0.05t = 0.355$$

$$t = 7.1 \text{ minutes}$$