

18/ENG05/049

OLOGBOSERE ANTHONIA

MECHATRONICS

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

$$dT = kt + c$$

$$T-25$$

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

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

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

At $t=0$ min

$$10 = T_0 + 25$$

$$10 - 25 = T_0$$

$$T_0 = -15$$

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

$$~~20 = -15e^{kT}~~$$

After 5 minutes = t

$$20 = -15e^{5k} + 25$$

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

$$0.33 = e^{5k}$$

$$-1.09 = 5k$$

$$k = -0.219$$

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

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

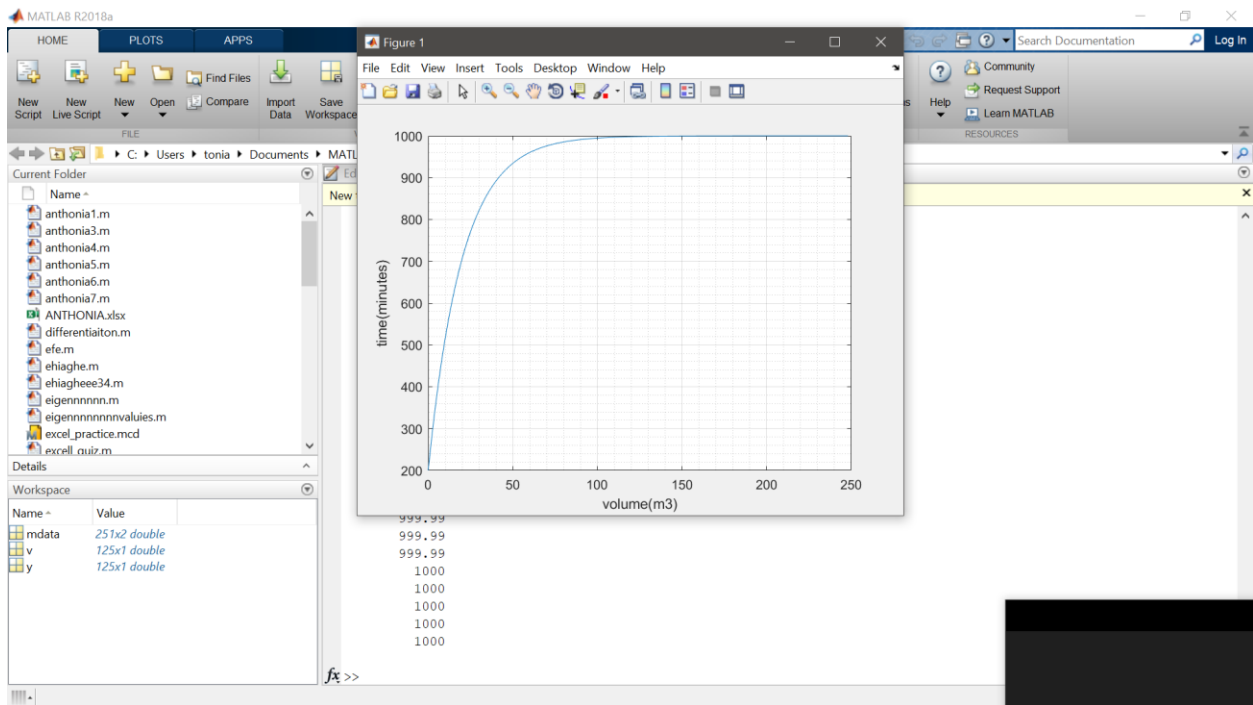
$$24.9 = -15e^{-0.219t} + 25$$

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

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

$$-5.01 = -0.219t$$

$$t = 22.88 \text{ mins}$$



The Editor window shows the script 'onlinequiz.m' with the following code:

```

1  commandwindow
2  clear all
3  clc
4  close all
5  format shortg
6  mdata = xlsread('onlinequizdata', 'fluiddata')
7  v = mdata(1:2:250, 1)
8  y = mdata(1:2:250, 2)
9  plot(v, y)
10 grid on
11 grid minor
12 xlabel('volume (m3)')
13 ylabel('time (minutes)')
14
15

```

The workspace shows variables: mdata (251x2 double), v (125x1 double), and y (125x1 double). The command window shows the text 'script'.

