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Dept: Civil Engineering

Q 1

$T_{initial} = 10°C$

$T = 20°C$ at 5 mins

$T_{actual} = 25°C$

$dT/dt \propto C[-T_n)$

$dT/dt = k(T - T_n)$

$dT/dt = k(T - 25)$

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

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

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

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

let

$e^{C} = A$

$T - 25 = Ae^{kt}$

$T = Ae^{kt} - 25$

at initial $t = 0$, $T = 10°C$

$10 = Ae^{0} - 25$

$A = 35$

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

at $T = 20°C$, $t = 5$ mins

$20° = 35e^{5k} - 25$

$45 = 35e^{5k}$

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

$\ln(e^{5}/35)$

$k = \frac{0.251}{5} = 0.05$

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

$T = 24.9$ at $t = ?$

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

$49.9 = 35e^{0.05t}$

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

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

$0.05t = 0.35$

$t = 7.1$ mins

MATLAB R2018a

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Editor - C:\Users\Seyitan\Documents\MATLAB\eng282quiz2.m

secondsemesterwork2.m | secondsemesterwork3.m | practicwass.m | excelmatlabwork1.m | excelt

```
1 -  commandwindow
2 -  clear
3 -  clc
4 -  close all
5 -  syms t V
6 -  mdata=xlsread('onlinequizdata','fluiddata');
7 -  t=mdata(1:2:250,1)
8 -  V=mdata(1:2:250,2)
9 -  plot(t,V)
10 -  grid on
11 -  grid minor
12 -  xlabel('Time(min')
13 -  ylabel('Volume(m3)')
```

Figure 1

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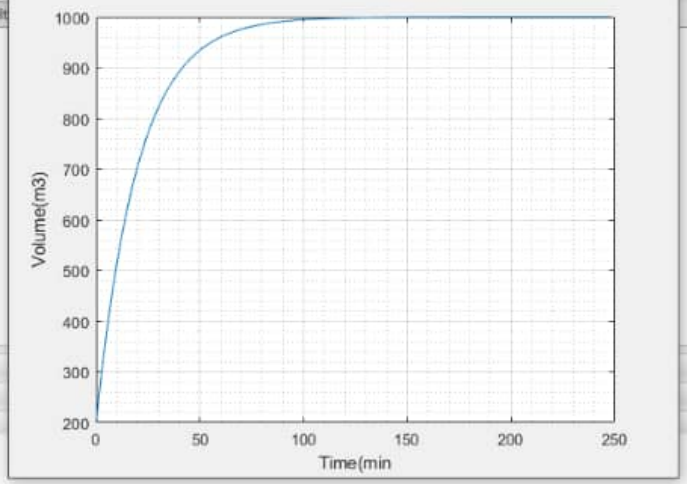

Current Folder

Workspace

Command Window

```
999.9934
999.9940
999.9946
999.9951
999.9956
999.9960
999.9964
999.9967
```

>>

script | Ln 7 | Col 19