**NAME: ADEYEMO OLIVE INIOLUWA**

**MATRIC NUMBER: 17/ENG05/003**

**DEPARTMENT: MECHATRONICS ENGINEERING**

**Assignment 4:**

**A)**

commandwindow

clear

clc

syms n(t)

olive= diff(n,t,2) - diff(n,t) - 12\*n== 144\*t^3 + 12.5

dolive= diff(n,t)

ini=[n(0)==5, dolive(0)==-0.5]

adey= dsolve(olive,ini)

pretty(adey)

tn=[0:0.1:1.5]

oliven= subs(adey,tn)

plot(tn,oliven)

axis tight

grid on

grid minor



**B)**

**i) Plotting the graph seperately**

commandwindow

clear

clc

syms y(t) x(t)

ole1=diff(y,t)-2\*x==exp(-2\*t)

ole2=diff(x,t)+y==exp(-t)

ole3=[ole,ole2]

cond=[y(0)=0,x(0)==0]

[yeq xeq]=dsolve(oli3,cond)

figure(1)

fplot (yeq)

grid on

grid minor

figure(2)

fplot (xeq)

grid on

grid minor

**Figure 1(yeq)**



**Figure 2 (xeq)**



**ii) Plotting the graph together**

commandwindow

clear

clc

syms y(t) x(t)

ole1=diff(y,t)-2\*x==exp(-2\*t)

ole2=diff(x,t)+y==exp(-t)

ole3=[ole1,ole2]

cond=[y(0)==0,x(0)==0]

[yeq xeq]=dsolve(oli3,cond)

fplot (yeq)

hold on

fplot (xeq)

grid on

grid minor

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**C)**

**i)** commandwindow

 clear

 clc

 syms t k a w

 ft= k\*exp(-a\*t)\*sin(5\*w\*t)\*cos(3\*w\*t)

 fs=laplace(ft)

ii) commandwindow

clear

clc

syms s

fs= pi/(s^2+15\*pi\*s+24\*pi^3)

ft= ilaplace (fs)