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**MATRIC NUMBER: 17/ENG01/025**

**DEPARTMENT: CHEMICAL ENGINEERING**

4(a)

CODE

commandwindow

clc

close all

syms n(t)

D=diff(n)

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

cond1=D(0)==-0.5;

cond2=n(0)==5;

cond3=[cond1 cond2];

sol=dsolve(ode,cond3);

sol1=simplify(sol)

t=[0:0.1:1.5]

sol2=subs(sol1)

plot(t,sol2)

grid on

grid minor

axis tight

OUTPUT



4(b)i

CODE

commandwindow

clear

clc

close all

syms y(t) x(t)

eqn1=diff(y,t)-2\*x==exp(-2\*t)

eqn2=diff(x,t)+y==exp(-t)

eqn3=[eqn1,eqn2]

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

[sol1 sol2]=dsolve(eqn3,cond)

fplot(sol1)

hold on

fplot(sol2)

legend('eqn1','eqn2','location','best')

grid on

grid minor

axis tight

OUTPUT



4(b)(ii)

CODE

commandwindow

clear

clc

close all

syms y(t) x(t)

eqn1=diff(y,t)-2\*x==exp(-2\*t)

eqn2=diff(x,t)+y==exp(-t)

eqn3=[eqn1,eqn2]

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

[solA solB]=dsolve(eqn3,cond)

figure (1)

fplot(solA)

grid on

grid minor

figure (2)

fplot(solB)

grid on

grid minor

axis tight

OUTPUT 1



OUTPUT 2



4c(i)

commandwindow

clc

syms w t k a

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

solutionA=laplace(eqn)

solutionB=simplify(solutionA)



4c(ii)

commandwindow

clear

clc

syms s

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

solution1=ilaplace(solve)

solution2=simplify(solution1)

