CHINEDUM PRUDENCE ESE
CHEMICAL ENGINEERING
~~CHEMICAL E~~ 17/ENG01007

ENG 381 : TEST

QUESTION 4 :

(4a)

```
Command Window
clc
clear
Close all

Syms n(t)
Eqn = diff(n,t,2) - diff(n,t) - 12*n == 144+(t^3)+12.5;
Cond = n(0) == 5, diff(n,t,2) == -0.5;
ysol = dsolve(eqn, cond)
t = 0:0.1:1.5
Yemi = subs(ysol)
fplot(yemi)
grid on
legend('Yemi', 'location', 'best')
```

(4b)

```
Command window
clc
clear
Close window

Syms n(t) y(t)
eqn1 = diff(y,t) - x*x == exp(-1*t);
eqn2 = diff(x,t) + y == exp(-t);
eqn5 = [eqn1, eqn2]

Cond = x(0) == 0, y(0) == 0;
Ans = dsolve(eqns, Cond)
```

xSol(t) = Ans * x

ySol(t) = Ans * y

ii) Visualizing the solution on graph separately continue with

fplot (xSol)

fplot (ySol)

Grid on

legend ('xSol', 'Location', 'best')

legend ('ySol', 'Location', 'best')

iii) Visualizing the solution on graphs together continue

fplot (xSol)

hold on

fplot (ySol)

grid on

legend (xsol', 'ysol', location, 'best')

4c

Command window

cle

clear

Closeall

Syms t s w x K a

x = K * exp(-a*t) * sin(3 * w*t) * cos(3wt)

F = laplace (x, t, s)

Simplify (F)

pretty (ans)

ii Syms t s

f = Pi * / ((s^2) + 15 * Pi * 5 + 24 * (pi ^ 3))

Ilaplace (f)

Simplify (ans)

pretty (ans.