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17/ENG06/034
Mechanical Engineering
ENG 381

Question 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
Paschal = Subs(Ysol)
fplot (Paschal)
grid On
Legend ('Paschal', Location: 'best')
```

Question 4B:

1) Command Window
2) clc
3) clear
4) close
5)
6) Syms x(t) y(t)
7) eqn1 = diff(y,t) - x*x == exp(-2*t);
8) eqn2 = diff(x,t) + y - exp(-t);
9) eqn3 = [eqn1 eqn2]

10) Cond = x(0) == 0 , y(0) = 0 ;
11) Ans = dsolve(eqns, Cond)
12) xSol(t) = Ans.x
13) ySol(t) = Ans.y

i) Visualizing the Solution on graph Seperately Continue with
14) fplot(xSol)
15) fplot(ySol)
16) grid On
17) legend('xSol', 'Location', best')
18) Legend('ySol', 'Location', best')

ii) Visualizing the Solution on graph together Continue with
14) fplot(xsol)
15) hold On
16) fplot(ysol)
17) grid On
18) legend(xsol', ysol', location', best')

Question 4e:

i) Command window

```
clc
Clear
Close all

Syms t s w x K a
x = K*exp(-a*t)*Sin(5*w*t)*Cos(3wt)
F = Laplace (x, t, s)
    Simplify (F)
    Pretty (ans)
```

ii) Command Window

```
Clc
Clear
Close all

Syms t s
F = P1*/((S^2)+15*P1*S + 24*(P1^3))
    iLaplace (F)
    Simplify (ans)
    Pretty (ans).
```