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 : 0.5
Yemi = Subs(ysol)
fplot(yemi)
grid on
Legend('Yemi', 'Location', 'best')
```

Question 4B

```
clc
clear
close

syms x(t) y(t)
eqn1 = diff(y,t) - x == exp(-2*t);
eqn2 = diff(x,t) + y == exp(-t);
eqns = [eqn1, eqn2]
Ans = dsolve(eqns, Cond)
Cond = x(0) == 0, y(0) == 0;
xSol(t) = Ans.x
ySol(t) = Ans.y
```

(a)

(i) Visualizing the Solution on graph Seperately continue with

```
fplot(xSol)
fplot(ySol)
grid on
Legend('xSol','Location','best')
legend('ySol','Location','best')
```

(ii) Visualizing the Solution on graph together Continue

```
fplot(xSol)
fplot(ySol) hold on
fplot(ySol)
grid on
```

15. legend ('sol', 'y sol', 'Location', 'best')

Question 4c

(i) Command window

```
clc
Clear
Close all

Syms t s w x K a
x = K*exp(-a*t) + sin(5*w*t) + cos(3*w*t)
F = Laplace (x, t, s)
Simplify (F)
Pretty(ans)
```

(ii) Command window

```
clc
Clear
Close all

Syms t s
F = Pi* /((s^2) + 15*pi*s + 24*(pi^3))
ilaplace (F)
Simplify (ans)
Pretty (ans)
```