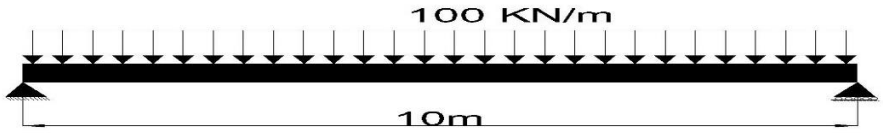
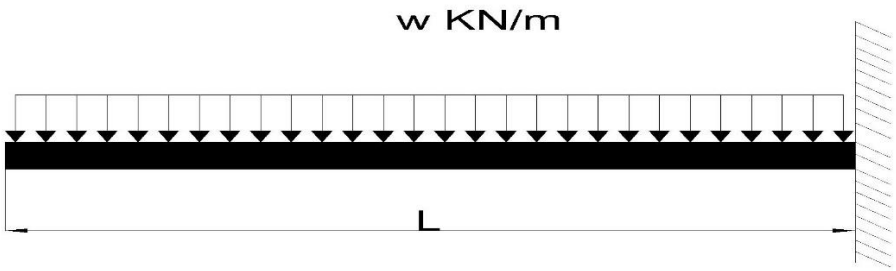
DETRMINANT STRUCTURE PROBLEMS

Q1.A Simple supported beam carrying an uniformly distributed load w KN\m of span L meters.Calculate the Reactions ,Shear Force ,Bending moment at mid span and also calculate slope and deflection at middile of span?(w=100KN\m,E=250*10^9 N/m^2 ,I=250*10^{-6} m^4 ,L=10m).



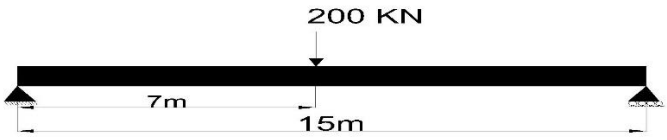
Ans= (R1=R2=500KN, S.F.D=0 KN ,B.M.D= 1250 KNm ,Slope=0 ,Deflection= 2.083e-04 m for mid span)

Q2.A Cantilever beam carrying an uniformly distributed load w KN\m of span L meters free hand at right side such that udl span same as beam span.Calculate the Reactions ,Shear Force ,Bending moment at fixed end and also calculate slope and deflection at free end?(w=80KN\m ,E=250*10^9 N/m^2 ,I=250*10^{-6} m^4 ,L=20m).



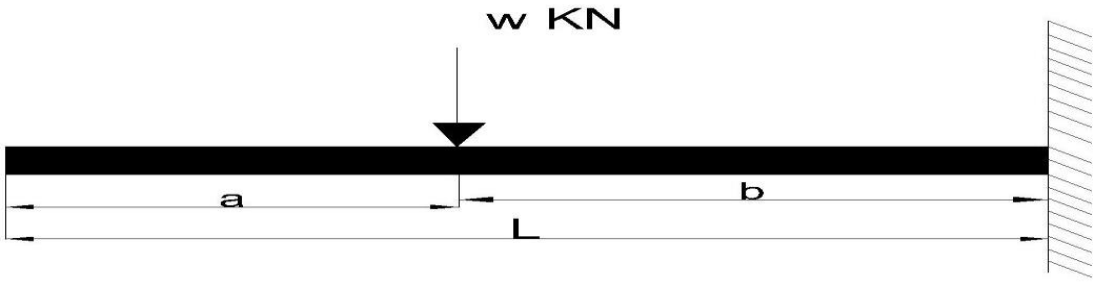
Ans= (R1=S.F.D=1600.00 KN,M1=B.M.D=-16000.00 KNm (fixed end) Slope=-1.707e-03 ,Deflection= 2.560e-02m free end)

Q3.A simple supported beam under the external point load 200 KN having span 15m acting on 7 m from the left support. Calculate the Reactions ,Shear Force ,Bending moment ,slope and deflection at 10m from left support?(E=250*10^9 N/m^2 ,I=250*10^{-6} m^4)



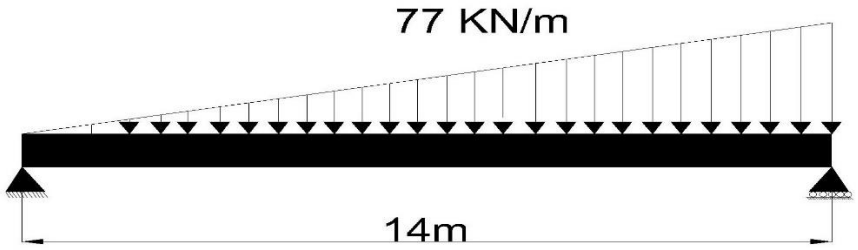
Ans= (R1=106.67 KN,R2=93.33 KN, S.F.D =-93.333 KN ,B.M.D= 466.667 KNm ,S lope=-3.772e-05 , Deflection= 1.879e-04m)

Q4. A cantilever beam under the external point load 1000 KN having span 20m acting on 10 m from the left free hand. Calculate the Reactions ,Shear Force ,Bending moment ,slope and deflection at 17m from left free?(E=250*10^9 N/m^2 ,I=250*10^{-6} m^4)



Ans = (R1= 1000.00 KN,M1= -10000.00 KNm, S.F.D= -1000.000 KN, B.M.D= -7000.000 KNm, slope= -5.760e-04, deflection = 6.480e-04m at x=17m)

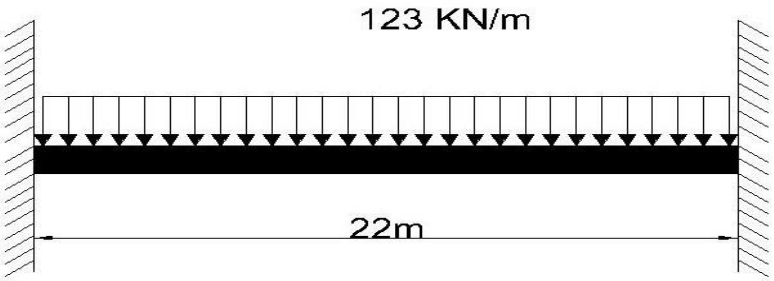
Q5. .A Simple supported beam carrying an uniformly varying load 77 KN\m of span 14 meters.Calculate the Reactions ,Shear Force ,Bending moment , slope and deflection at 4m from right end?(E=250*10^9 N/m^2 ,I=250*10^{-6} m^4).



Ans= (R1= 179.67 KN, R2=-359.33 KN, S.F.D =-95.333 KN,B.M.D= 880.000 KNm, slope= 1.071e-04 , B.M.D= 4.058e-04m at 4m fro right support)

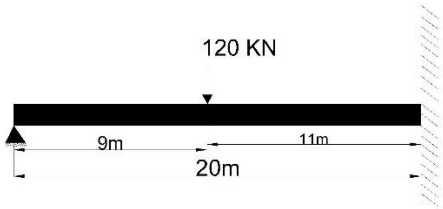
INDETRMINANT STRUCTURE PROBLEMS

Q6. A fixed beam carrying an uniformly distributed load w KN\m of span L meters.Calculate the Reactions,Shear Force, Bending moment ,slope and deflection at middile of span?(w=123KN\m,E=250*10^9 N/m^2 ,I=250*10^{-6} m^4 ,L=22m).



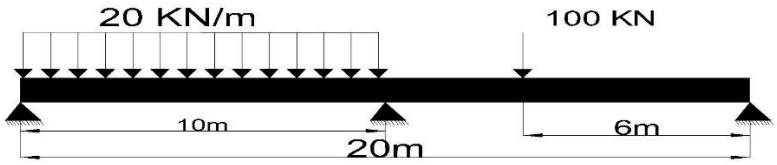
Ans= (R1=R2= 1353.00 KN, M1=M2= -4961.00 KNm, S.F.D=0.00 KN , B.M.D= 2480.500 KNm, slope= 0.000e+00, Deflection= 1.201e-03m middile of the span)

Q7.Analysis the propped cantilever beam under the load of 120 KN at a distance 9m from the left hinged support having span of 20m. Calculate the Reactions ,Shear Force ,Bending moment , slope and deflection at 18m from left support ?(E=250*10^9 N/m^2 ,I=250*10^{-6} m^4).



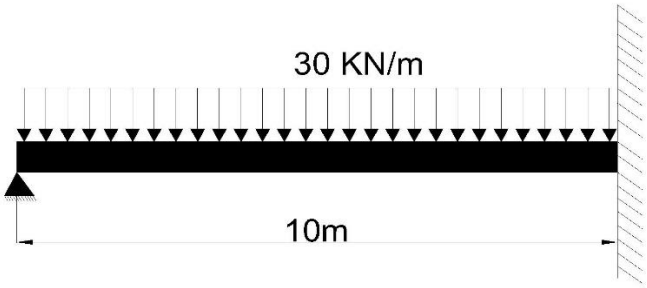
Ans- R1=44.46 KN,R2=30.982 KN, S.F.D =-75.532 KN ,B.M.D= -279.585 KNm ,S lope=1.572e-05, Deflection= -1.539e-05m at 18 m from left)

Q8.A continuous beam with equal alignment such that no deflection in middile.An external load acting on each beam 20KN/m and 100 KN at distance of 6m from right hinge in first and second member of the beam of span 20m respectively. Calculate S.F.D and B.M.D and reactions at a 16m from left end?(E=250*10^9 N/m^2 ,I=250*10^{-6} m^4).



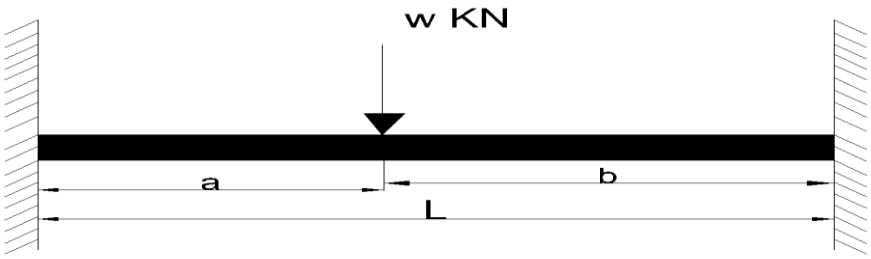
Ans= (R1= 36.60KN , R2= 286.80 KN,R3= -23.40 KN ,M1= 0.00 KNm , M2= -634.00KNm ,M3=0.00KN ,S.F.D= 123.400KN , B.M.D= 106.400 KNm)

Q9. Calculate the Deflection and slope in 10m propped cantilever at 3m from left support having udl 30 KN/m?(E=250*10^9 N/m^2 ,I=250*10^{-6} m^4).



Ans=(R1= 112.50 KN ,R2= 187.00 KN ,M1= -375.00 KNm , S.F.D= 22.5 KN , B.M.D= 202.5 KNm at 3m from left)

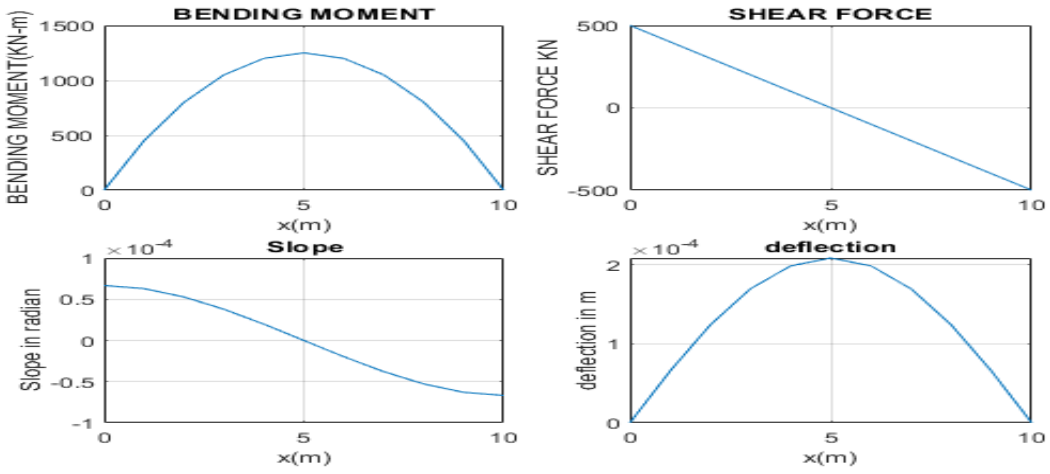
Q10.A Fixed beam carry point load 360 kN of span 15m at a position of 5m from left support and calculate the maximum deflection ? also maximum deflection?(E=250*10^9 N/m^2 ,I=250*10^{-6} m^4).



Ans= (R1=266.67 KN , R2=93.33KN ,M1= -800.00 KNm , M2=-400.00KNm ,Dmax= 7.680000e-05m,S.F.D=266.67 KN , B.M.D= 533.333 KNm)

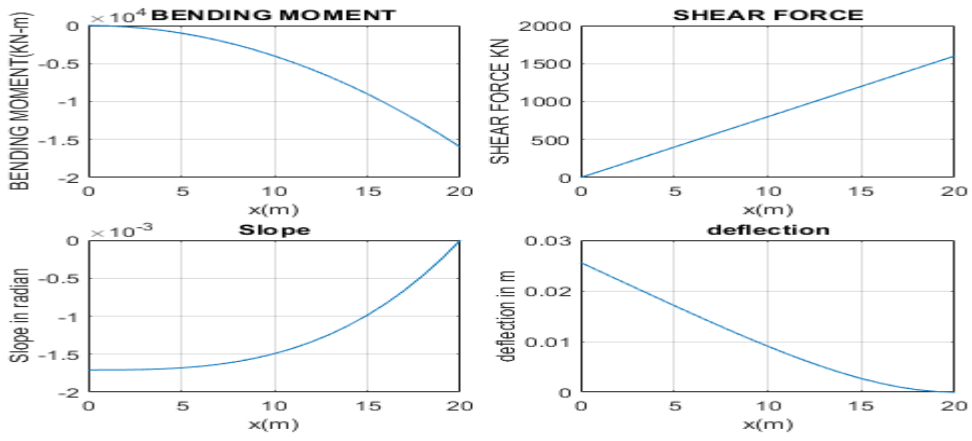
Q1.Ans-

```
disp('Analysis of Simple supported beam having UDL:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the udl load in KN/m:\n');
R1=w*L/2;
R2=w*L/2;
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm)  theta(radian)  deflection(m)\n');
for k=1:1:(L+1)
    X1(k)=X(k);
    V(k)=w*((L/2)-X1(k));
    M(k)=w*(X1(k)/2)*(L- X1(k));
    Th(k)=(w/(24*E*I))*(L^3-6*L*X1(k)^2+4*X1(k)^3);
    def(k)=(w*X1(k)/(24*E*I))*(L^3-2*L*X1(k)^2+X1(k)^3);
    fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
 xlabel('x(m)');
 ylabel('BENDING MOMENT(KN-m)');
 grid on;
 subplot(2,2,2);
  plot(X,V)
  title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```



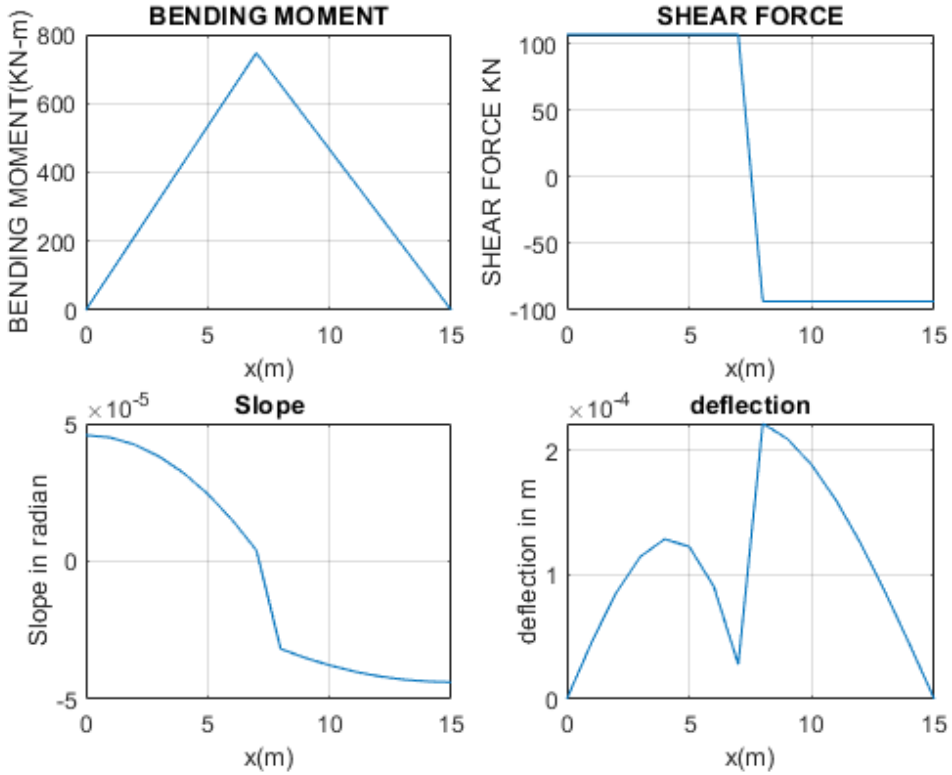
Q2. Ans-

```
disp('Analysis of cantilever beam having UDL:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the udl load in KN/m:\n');
R1=w*L;
M1=-(w*L^2)/2;
fprintf('R1=%6f KN\n',R1);
fprintf('M1=%6f KNm\n',M1);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm)  theta(radian)  deflection(m)\n');
for k=1:1:(L+1)
    X1(k)=X(k);
    V(k)=w*X1(k);
    M(k)=-w*((X1(k)^2)/2);
    Th(k)=(w/(24*E*I))*(4*X1(k)^3-4*L^3);
    def(k)=(w/(24*E*I))*(X1(k)^4-4*L^3*X1(k)+3*L^4);
    fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,2,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```



Q3-ans

```
disp('Analysis of Simple supported beam having Point Load:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the point load in KN:\n');
a=input('enter the position of point load from left support:\n');
b=L-a;
R1=w*b/L;
R2=w*a/L;
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm) theta(radian) deflection(m)\n');
for k=1:1:(L+1)
    if X(k)<=a
    X1(k)=X(k);
    V(k)=R1;
    M(k)=R1*X1(k);
     Th(k)=((w*b)/(6*E*I*L))*(L^2-b^2-3*X(k)^2);
     def(k)=((w*b*X1(k))/(6*E*I*L))*(L^2-b^2-3*X(k)^2);

fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
    else if a<X(k)<=L
            X2(k)=X(k);
            V(k)=R1-w;
            M(k)=R1*(X2(k))-w*(X2(k)-a);
            Th(k)=((w*a)*((-L*X2(k)*2)+X2(k)^2+a^2)+(L-X2(k))*((-
L*X2(k)*2)+X2(k)^2+a^2))/(6*I*E*L);
            def(k)=(((w*a)*(L-X2(k))/(6*E*I*L))*(L*X2(k)*2-X2(k)^2-a^2));

fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
        end
    end
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,2,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```

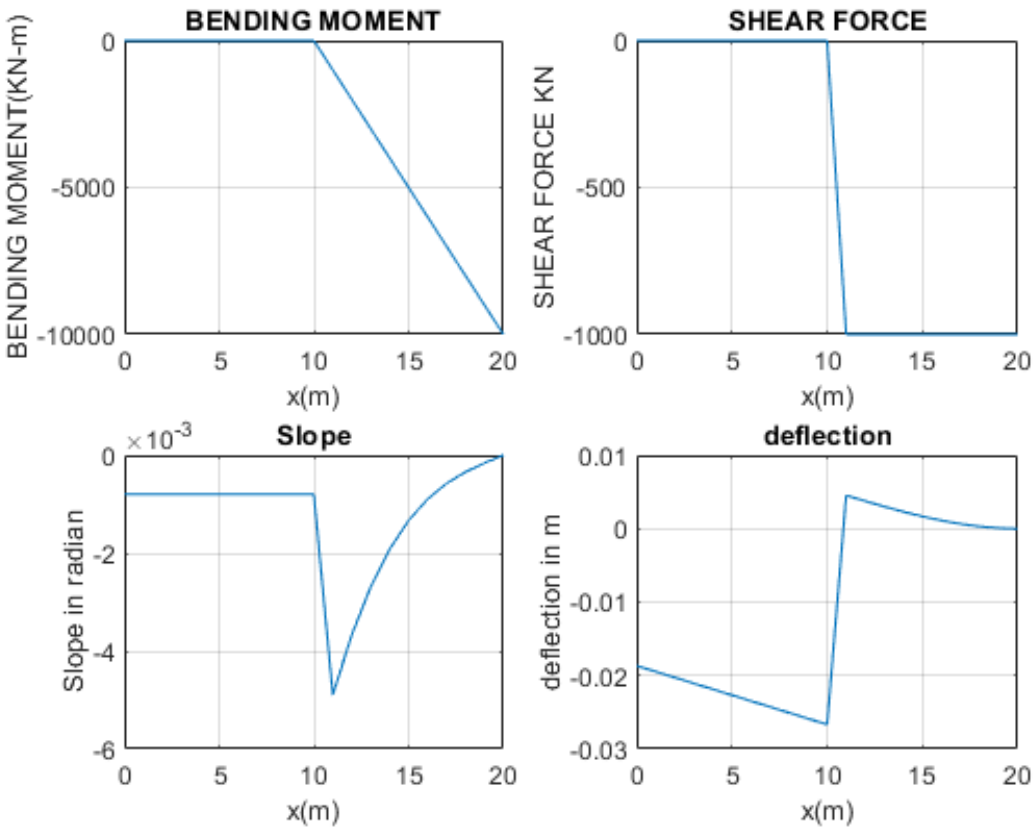


Q4.

Ans-

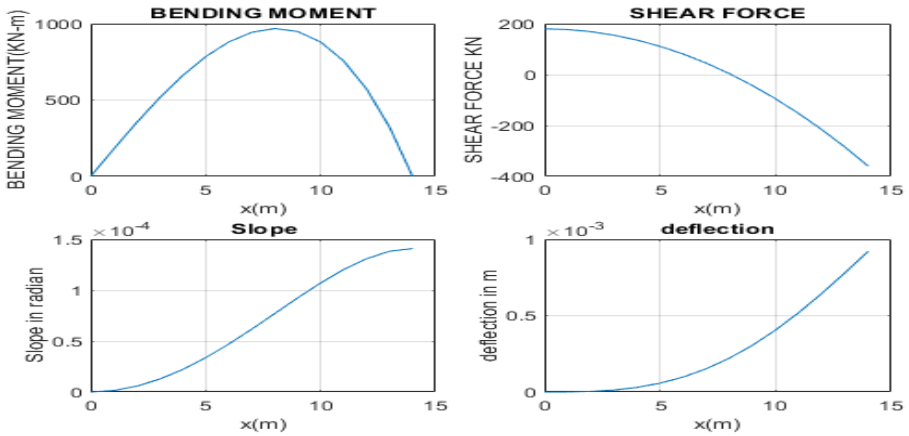
```
disp('Analysis of Cantilever beam having Point Load and left side free
end:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the point load in KN:\n');
a=input('enter the position of point load from left side:\n');
b=L-a;
R1=w;
M1=-w*b;
fprintf('R1=%6f KN\n',R1);
fprintf('M1=%6f KNm\n',M1);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm) theta(radian) deflection(m)\n');
for k=1:1:(L+1)
    if X(k)<=a
    X1(k)=X(k);
    V(k)=0;
    M(k)=0;
     Th(k)=((w*b^2)/(6*E*I))*(-3);
     def(k)=((w*b^2)/(6*E*I))*(-3*L-3*X1(k)-b);

fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
    else if a<X(k)<=L
            X2(k)=X(k);
            V(k)=-w;
            M(k)=-w*(X2(k)-a);
            Th(k)=((w)/(6*E*I))*(-2*(L-X2(k))*((3*b-L+X2(k))+(L-X2(k))^2));
            def(k)=((w*(L-X2(k))^2)/(6*E*I))*(3*b-L+X2(k));
```

```
fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
        end
    end
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,2,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```



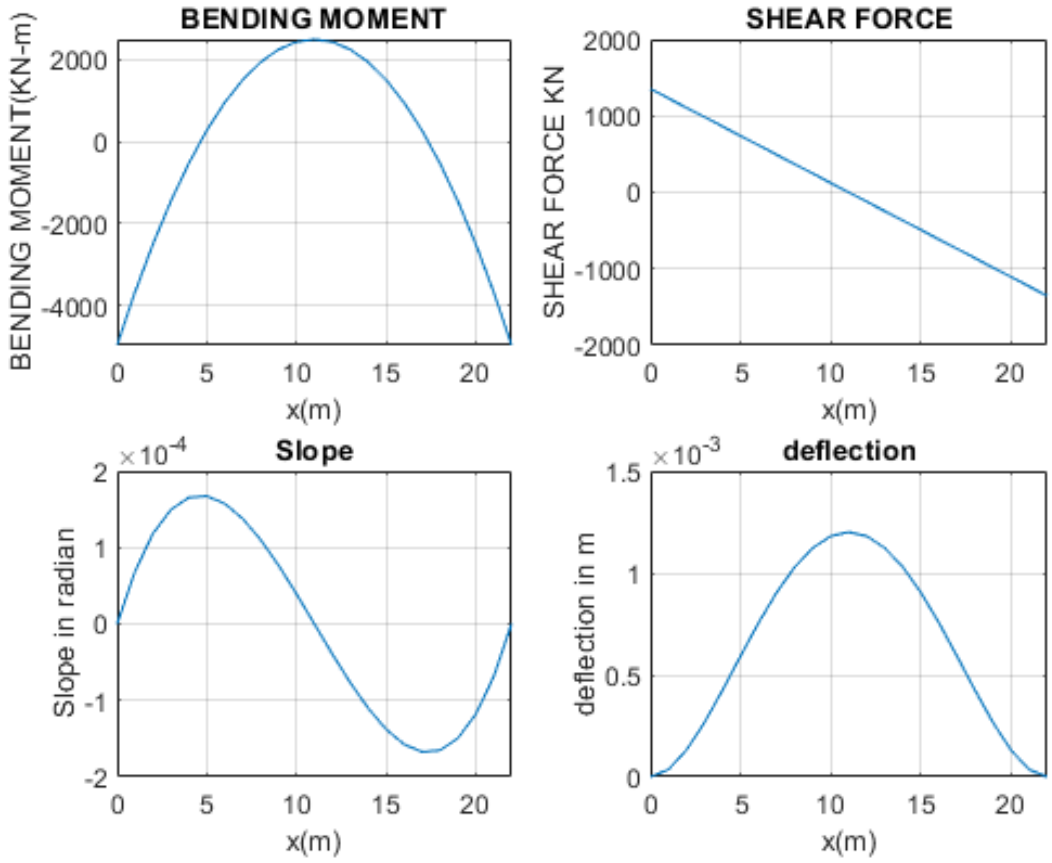
Q5.-Ans-

```
disp('Analysis of Simple supported beam having UVL:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the uvl load in KN/m:\n');
R1=w*L/6;
R2=-w*L/3;
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
X=0:1:L;
disp('distance(m)  shear(KN)   BM(KNm)   theta(radian)   deflection(m)\n');
for k=1:1:(L+1)
    X1(k)=X(k);
    V(k)=w*(L/6-(X1(k)^2)/(2*L));
    M(k)=w*(X1(k)/6)*(L-(X1(k)^2)/L);
    Th(k)=(w*L*(X1(k)^2)/12-w*(X1(k)^4)/(24*L))/(E*I);
    def(k)=(w*L*(X1(k)^3)/36-w*(X1(k)^5)/(120*L))/(E*I);
    fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,2,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```



Q6.Ans-

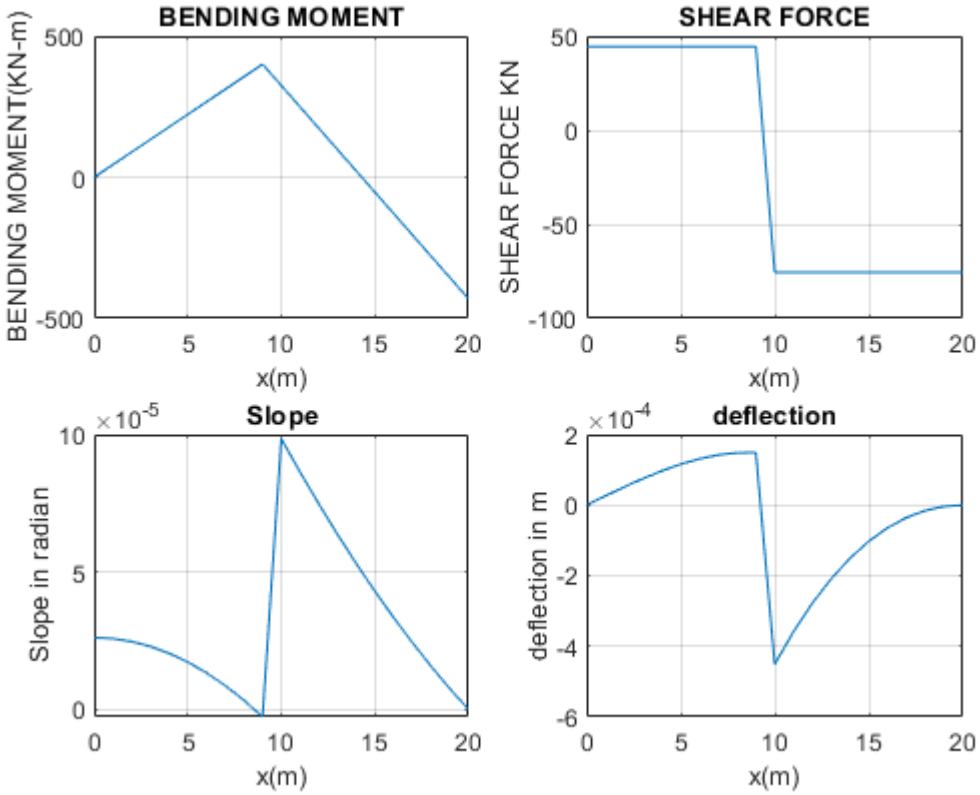
```
disp('Analysis of fixed beam having UDL:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the udl load in KN/m:\n');
R1=w*L/2;
R2=w*L/2;
M1=-(w*L^2)/12;
M2=-(w*L^2)/12;
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
fprintf('M1=%6f KNm\n',M1);
fprintf('M2=%6f KNm\n',M2);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm)  theta(radian)  deflection(m)\n');
for k=1:1:(L+1)
    X1(k)=X(k);
    V(k)=w*((L/2)-X1(k));
    M(k)=(w/12)*(6*L*X1(k)-L^2-6*X1(k)^2);
    Th(k)=w*(2*X1(k)*L^2-6*L*X1(k)^2+4*X1(k)^3)/(24*E*I);
    def(k)=(w*X(k)^2)*(L^2-2*L*X1(k)+X1(k)^2)/(24*E*I);
    fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,2,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```



Q7.Ans-

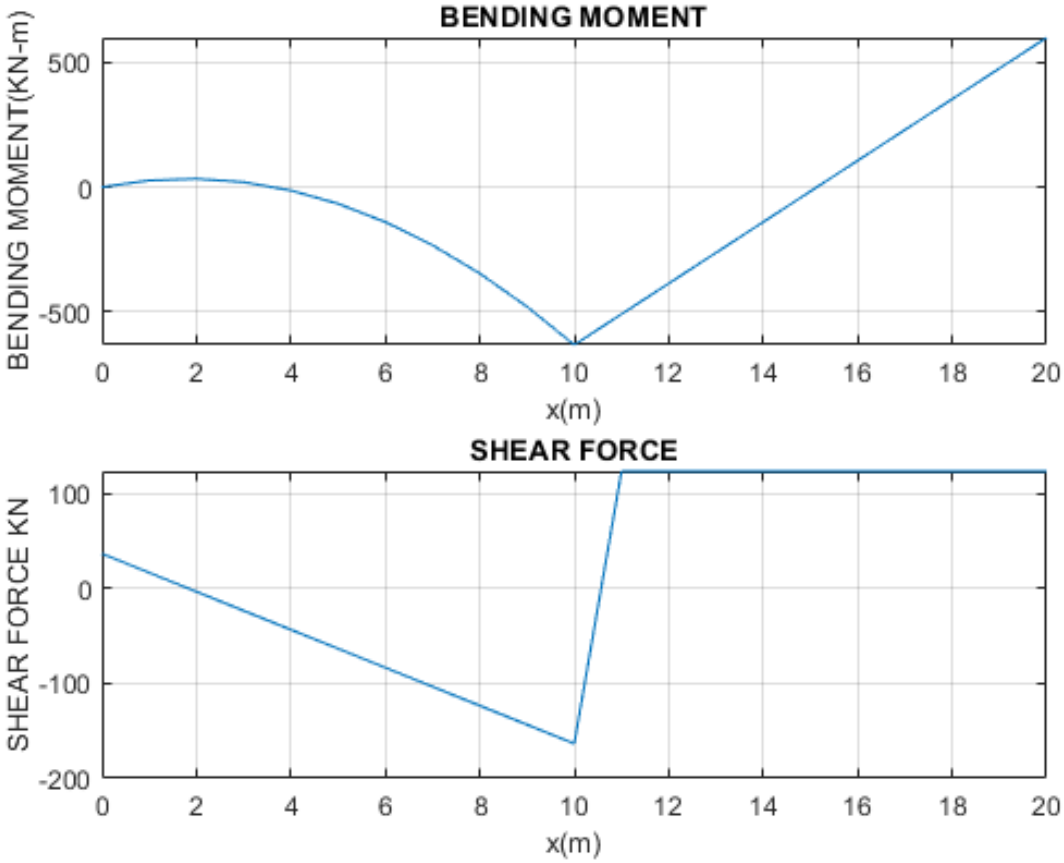
```
disp('Analysis of Propped Cantilever beam having point load fixed from
right side:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the Concentrated load in KN:\n');
a=input('enter the position of point load from left support:\n');
b=L-a;
R1=w*(3*(b^2)*L-b^3)/(2*L^3);
R2=w*(3*(a^2)*L-a^3)/(2*L^3);
M1=R1*L-w*b;
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
fprintf('M1=%6f KNm\n',M1);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm)  theta(radian)  deflection(m)\n');
for k=1:1:(L+1)
    if X(k)<=a
      X1(k)=X(k);
```

```
      V(k)=R1;
      M(k)=w*X1(k)*(3*(b^2)*L-b^3)/(2*L^3);
      Th(k)=(3*R1*L^2-3*R1*X1(k)^2-3*w*((L-a)^2))/(6*E*I);
      def(k)=(3*R1*L^2*X1(k)-R1*X1(k)^3-3*w*((L-a)^2)*X1(k))/(6*E*I);

fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
    else if a<X(k)<=L
            X2(k)=X(k);
            V(k)=R1-w;
            M(k)=(w*X2(k)*(3*(b^2)*L-b^3)/(2*L^3))-(w*(X2(k)-a));
            Th(k)=(R2*(3*X2(k)^2-3*L^2)+6*w*a*(L-X2(k)))/(6*E*I);
            def(k)=(R2*(X2(k)^3-3*L^2*X2(k)+2*L^3)-3*w*a*(L-
X2(k))^2)/(6*E*I);

fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
        end
    end
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,2,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```


BENDING MOMENT
BENDING MOMENT(KN-m)
500
0
-500
0
5
10
15
20
x(m)
SHEAR FORCE
SHEAR FORCE KN
50
0
-50
-100
0
5
10
15
20
x(m)
Slope
×10^-5
Slope in radian
10
5
0
0
5
10
15
20
x(m)
deflection
×10^-4
deflection in m
2
0
-2
-4
-6
0
5
10
15
20
x(m)

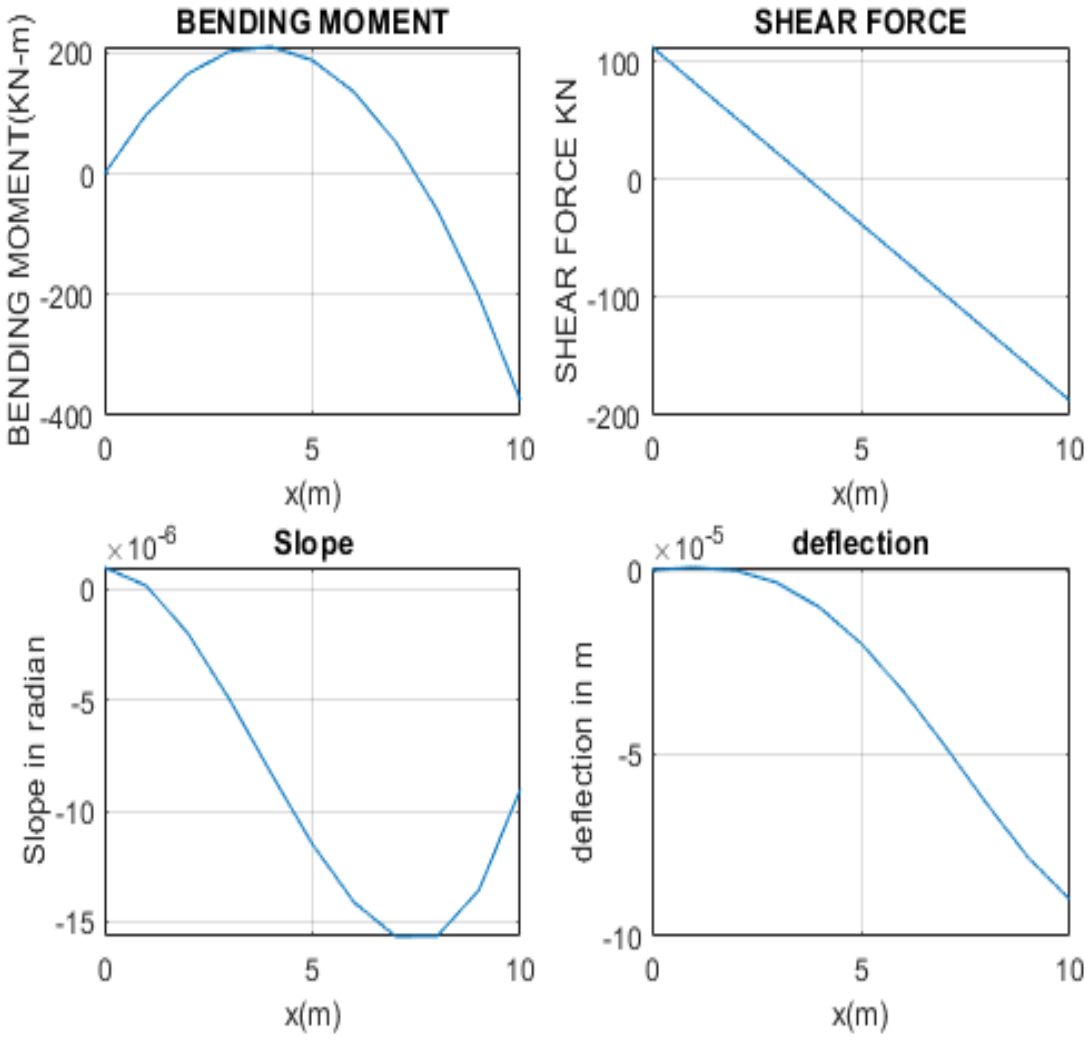
Q8.Ans-

```
disp('Analysis of continious beam having 3 hinged support  with equal
alignment:\n');
L=input('enter the first span of beam or second in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w1=input('enter the udl load in KN\m:\n');
w2=input('enter the point load in KN:\n');
a=input('enter the position of point load from 1st beam:\n');
b=L-a;
x1=L/2;
x2=(L+b)/3;
A1=(2/3)*(L/2)*w1*(L^2)/8;
A2=(1/2)*L*w2*a*b/L;
M1=0;
M3=0;
M2=(-6/L)*((A1*x1/L)+(A2*x2/L));
R1=(M2/L)+(w1*L/2);
R3=(M2/L)+w2*a/L;
R2=w1*L+w2-R1-R3;
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
fprintf('R3=%6f KN\n',R3);
fprintf('M1=%6f KNm\n',M1);
fprintf('M2(MIDDILE)=%6f KNm\n',M2);
fprintf('M3=%6f KNm\n',M3);
X=0:1:2*L;
disp('distance(m) shear(KN)  BM(KNm):\n');
for k=1:1:(2*L+1)
    if X(k)<=L
        X1(k)=X(k);
        V(k)=R1-w1*X1(k);
        M(k)=R1*X1(k)-w1*(X1(k)^2)/2;
        fprintf('%4.0f%12.3f%14.3f\n',X(k),V(k),M(k));
    elseif L<X(k)<=(L+a)
            X2(k)=X(k);
            V(k)=R1-w1*L+R2;
            M(k)=R1*X2(k)-w1*L*((L/2)+(X2(k)-L))+R2*((X2(k)-L));
            fprintf('%4.0f%12.3f%14.3f\n',X(k),V(k),M(k));
        elseif (L+a)<X(k)<=(2*L)
                X3(k)=X(k);
                V(k)=R1-w1*L+R2-w2;
                M(k)=R1*X3(k)-w1*L*((L/2)+a+X3(k)-(L+a))+R2*(X3(k)-L)-
w2*(X3(k)-(L+a));
                fprintf('%4.0f%12.3f%14.3f\n',X(k),V(k),M(k));
    end
end
subplot(2,1,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,1,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
```


BENDING MOMENT
BENDING MOMENT(KN-m)
500
0
-500
0
2
4
6
8
10
12
14
16
18
20
x(m)
SHEAR FORCE
SHEAR FORCE KN
100
0
-100
-200
0
2
4
6
8
10
12
14
16
18
20
x(m)

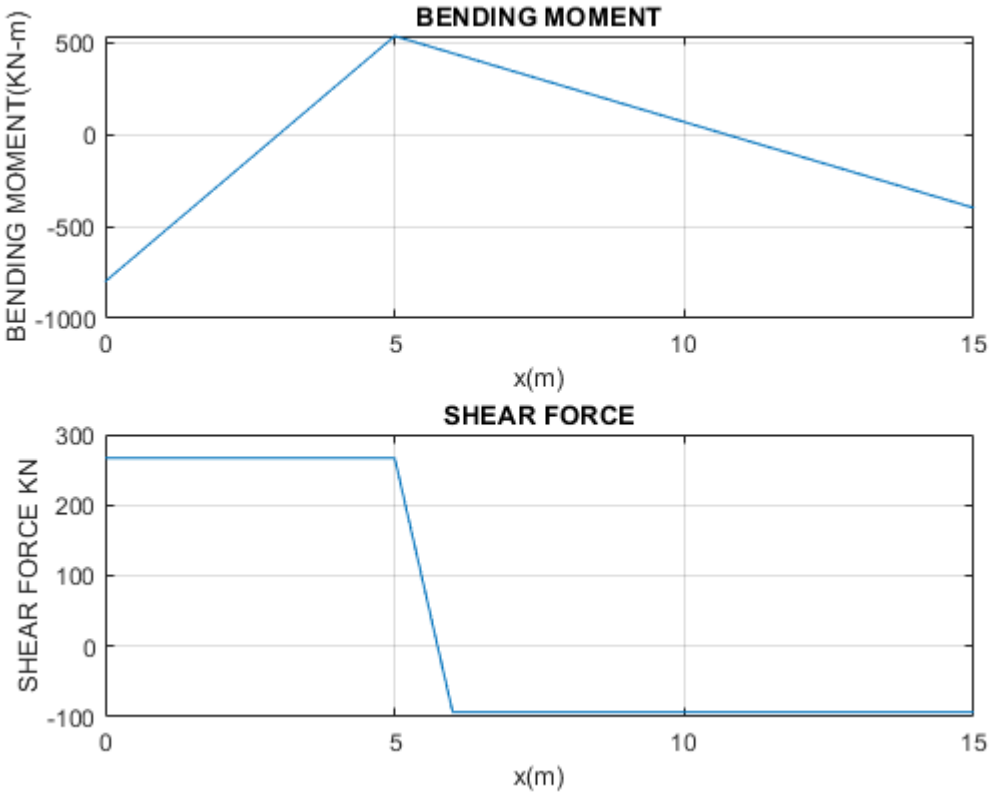
Q9.Ans-

```
disp('Analysis of Propped Cantilever beam having udl load fixed from right
side:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the udl load in KN\m:\n');
R1=w*3*L/8;
R2=w*5*L/8;
M1=R1*L-(w*L^2)/2;
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
fprintf('M1=%6f KNm\n',M1);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm)  theta(radian)  deflection(m)\n');
for k=1:1:(L+1)
    X1(k)=X(k);
    V(k)=R1-w*X1(k);
    M(k)=R1*X1(k)-w*(X1(k)^2)/2;
    Th(k)=(w/(48*E*I))*(L^2-9*L*X1(k)^2+8*X1(k)^3);
    def(k)=(w/(48*E*I))*((L^2)*X1(k)-3*L*X1(k)^3+2*X1(k)^4);
    fprintf('%4.0f%12.3f%14.3f%19.3e%19.3e\n',X(k),V(k),M(k),Th(k),def(k));
end
subplot(2,2,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,2,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
   subplot(2,2,3);
   plot(X,Th)
     title('Slope');
    xlabel('x(m)');
    ylabel('Slope in radian');
   grid on
   subplot(2,2,4);
   plot(X,def)
     title('deflection');
    xlabel('x(m)');
    ylabel('deflection in m');
   grid on
```


BENDING MOMENT
BENDING MOMENT(KN-m)
200
0
-200
-400
0
5
10
x(m)
SHEAR FORCE
SHEAR FORCE KN
100
0
-100
-200
0
5
10
x(m)
Slope
×10^-6
Slope in radian
0
-5
-10
-15
0
5
10
x(m)
deflection
×10^-5
deflection in m
0
-5
-10
0
5
10
x(m)

Q10.Ans-

```
disp('Analysis of fixed beam having point load in arbitary position:\n');
L=input('enter the span of beam in m:\n');
E=input('enter the value of the modulus of the elasticity(N/m^2):\n');
I=input('enter the value of the moment of inertia(m^4):\n');
w=input('enter the point load in KN:\n');
a=input('enter the position of load from left support:\n');
b=L-a;
R1=w*((b^2)*(3*a+b)/(L^3));
R2=w*((a^2)*(3*b+a)/(L^3));
M1=-(w*a*b^2)/(L^2);
M2=-(w*b*a^2)/(L^2);
fprintf('R1=%6f KN\n',R1);
fprintf('R2=%6f KN\n',R2);
fprintf('M1=%6f KNm\n',M1);
fprintf('M2=%6f KNm\n',M2);
X=0:1:L;
disp('distance(m) shear(KN)  BM(KNm):\n');
for k=1:1:(L+1)
    if X(k)<=a
    X1(k)=X(k);
    V(k)=R1;
    M(k)=M1+R1*X1(k);
    fprintf('%4.0f%12.3f%14.3f\n',X(k),V(k),M(k));
    elseif a<X(k)<=L
        X2(k)=X(k);
        V(k)=R1-w;
        M(k)=M1+R1*X2(k)-w*(X2(k)-a);
        fprintf('%4.0f%12.3f%14.3f\n',X(k),V(k),M(k));
    end
end
Dmax=(2*w*a^3*b^2)/(3*E*I*(3*a+b)^2);
fprintf('Dmax=%18e KNm\n',Dmax);
subplot(2,1,1);
plot(X,M)
title('BENDING MOMENT');
    xlabel('x(m)');
    ylabel('BENDING MOMENT(KN-m)');
    grid on;
    subplot(2,1,2);
    plot(X,V)
     title('SHEAR FORCE');
    xlabel('x(m)');
    ylabel('SHEAR FORCE KN');
   grid on
```


BENDING MOMENT
BENDING MOMENT(KN-m)
500
0
-500
-1000
0
5
10
15
x(m)
SHEAR FORCE
SHEAR FORCE KN
300
200
100
0
-100
0
5
10
15
x(m)