Problem statement: Write a python programme to calculate reaction, shear force and bending moment values for Cantilever beam of length L and carrying point load at a distance 2m from free end. and also plot SFD and BMD. Take L= 5m w=10kN/m

```
import numpy as np
L=5.0
P=10.0
a=2.0
Rb=P
Mb=-P*(L-a)
print('L=',L,'m; P = ',P,'kN')
print('Rb=',Rb,'kN')
print('Mb=',Mb,'kN-m')
xx=np.linspace(0,L,101)
sf=np.zeros(xx.shape,dtype=float)
bm=np.zeros(xx.shape,dtype=float)
datum=np.zeros(xx.shape,dtype=float)
for i in range(len(xx)):
   if(xx[i]<=a):
      sf[i]=0
      bm[i]=0
   else:
      sf[i]=-P
      bm[i]=-P*(xx[i]-a)
print('sf=',sf)
```

```
print('bm=',bm)
import matplotlib.pyplot as plt
plt.subplot(311)
plt.plot(xx,sf,'r-',label='sf')
plt.plot(xx,datum,'g-',label='datum')
plt.legend()
plt.grid()
plt.xlabel('distance x in m')
plt.ylabel('SF in kN')
plt.title('SFD')
plt.subplot(313)
plt.plot(xx,bm,'b-',label='bm')
plt.plot(xx,datum,'g-',label='datum')
plt.legend(loc=5)
plt.grid()
plt.xlabel('distance x in m')
plt.ylabel('BM in kN-m')
plt.title('BMD')
```

## OUT PUT

L= 5.0 m; P =  10.0 kN

Rb= 10.0 kN

Mb= -30.0 kN-m

sf= [  0.   0.   0. -10. -10. -10.]

bm= [  0.   0.   0. -10. -20. -30.]

## SFD AND BMD