Problem statement: Write a python programme to calculate reaction, shear force and bending moment values for simply supported beam of length L and carrying point load P at a distance 2m from support A. and also plot SFD and BMD. Take L= 5m w=20kN/m

```
import numpy as np
L=5.0
P=20.0
a=2.0
print("L=",L,"m","P=",P,"kN","a=",2,"m",)
Rb=P*a/L
Ra=P-Rb
print("Rb=",Rb,"kN","Ra=",Ra,"kN")
xx=np.linspace(0.0,L,6)
V=np.zeros(xx.shape,dtype=float)
M=np.zeros(xx.shape,dtype=float)
datum=np.zeros(xx.shape,dtype=float)
print("xx=",xx)
for i in range(len(xx)):
   if(xx[i]<=a):
      V[i]=Ra
      M[i]=Ra*xx[i]
   else:
      V[i]=Ra-P
      M[i]=Ra*xx[i]-P*(xx[i]-a)
```

```
Mmax=max(abs(M))
print("V=",V)
print("M=",M)
print("Mmax=",Mmax,"kN-m")
import matplotlib.pyplot as plt
plt.subplot(311)
plt.plot(xx,V,'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,M,'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= 20.0 kN a= 2 m

Rb= 8.0 kN Ra= 12.0 kN

xx= [0. 1. 2. 3. 4. 5.]

V= [12. 12. 12. -8. -8. -8.]

M= [0. 12. 24. 16. 8. 0.]

Mmax= 24.0 kN-m

SFD AND BMD