REVISION OF CONCEPT OF NORMAL STRESSES

1. During a tension test, a mild steel specimen of diameter 12mm and gauge length 60mm elongates to 75mm. The rod can sustain a maximum load of 50kN, but yields at 25 kN and breaks at 30 kN. Find the following:

   (i)   Yield strength
   (ii)   Ultimate strength
   (iii)   Strength at failure
   (iv)   Actual strength at failure when the diameter reduces to 8mm
   (v)   Percentage elongation
   (vi)   Percent reduction in area

   (Ans: 221.06 MPa, 442.12 MPa, 265.27 MPa, 596.9 MPa, 25%, 55.55%)

2. A bar of different crossections is subjected to a tensile force of 50 kN as shown below. Find the stresses in different sections and the total elongation produced in the bar. Take E = 200 GPa
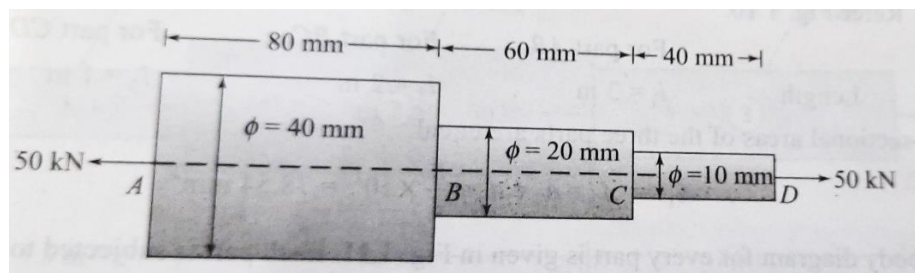
   (Ans: Stresses in AB, BC and CD bars are 39.78, 159.15 , 636.62 MPa; Total elongation in the bar is 0.191mm)

3. A prismatic bar 0f 10mm diameter is subjected to different axail forces as shown below. Calculate the net forces and stresses in the bar. Also calculate the net change in length of the bar . Take E = 200 kN/mm^2).
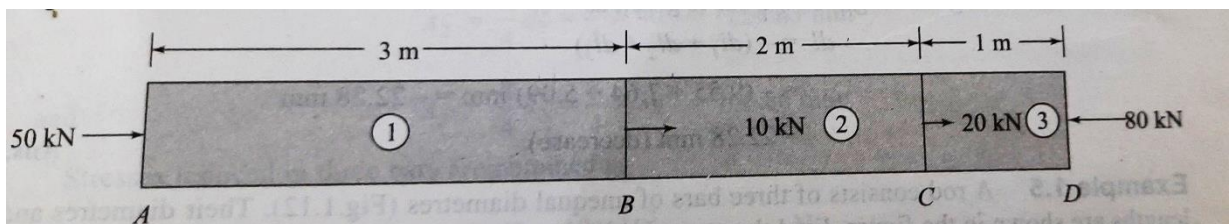
   (Ans: Forces in AB, BC and CD are -50 , -60, -80 kN; net change in length = -22.28mm)