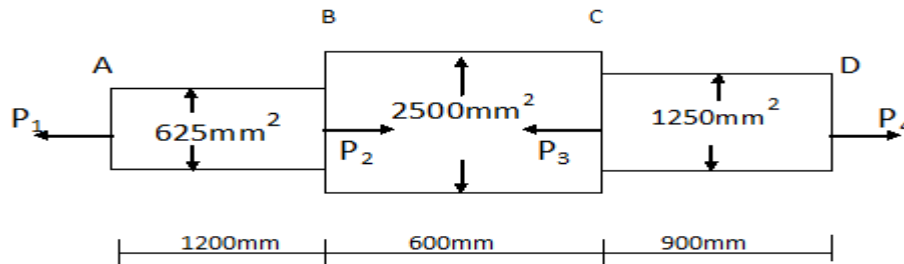


Assignment – I

1..A member is subjected to point loads as shown in figure .Calculate the force P₃, necessary for equilibrium if P₁= 45kN, P₂= 450 kN and P₄ = 130 kN. Determine total elongation of the member, Assuming the modulus of elasticity to be E= 2.1x10⁵ N/mm².



2. A simply supported beam of 11m carries point loads of 40kN, 50kN and 30kN at distances 3m, 7m and 8m respectively from left support. Draw S.F. and B.M. diagrams.

3. An axial pull of 40000 N is acting on a bar consisting of three sections of length 30 cm, 25 cm and 20 cm and of diameters 2 cm, 4 cm and 5 cm respectively. If the Young's modulus = 2.0x10⁵ N/mm²

Determine: i) stress in each section and ii) total extension of the bar.

4. A Simply supported beam of length 6 metres carries a UDL of 20kN/m throughout its length and a point of 30 kN at 2 metres from the right support. Draw the shear force and bending moment diagram.

5. A bar of 30 mm diameter is subjected to a pull of 40 kN. The measured extension on gauge length of 200 mm is 0.12 mm and the change in diameter is 0.0036 mm. Calculate the Poisson's ratio and the value of E,G and K.

6. A hollow shaft having an inside diameter 60% of its outside diameter is to replace the solid shaft transmitting the same power at the same speed. Calculate the percentage of saving in material, if the material to be used is also the same.

7. A spherical shell of internal diameter 0.9 m and of thickness 10 mm is subjected to an internal pressure of 1.4 N/mm². Determine the increase in diameter and increase in volume. Take E= 2x10⁵ N/mm² and Poisson's ratio= 1/3.

8. A thin cylindrical tube 100 mm internal diameter and 5 mm thick is closed at ends is subjected to an internal pressure of 5N/mm². A torque of 22000x10² is applied to the tube. Find the hoop stress, longitudinal stress, maximum and minimum principal stresses and the maximum shear stress.

9. Determine the diameter of the solid shaft which will transmit 300 kW at 250 rpm. The maximum shear stress should not exceed 30 N/mm² and twist should not be more than 1° in the shaft length of 2 m. Take the modulus of rigidity = 1x10⁵ N/mm²