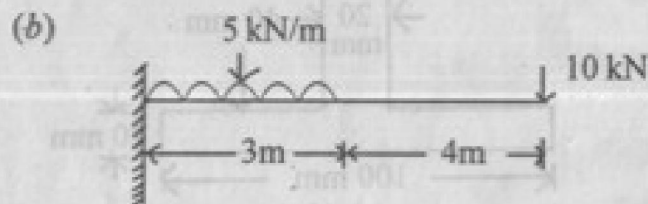


2. (a) Define stress and strain. 2

(b) Define stress strain relationship for a ductile material. 5

(c) A beam of length 5 m is simply supported at the ends, carries a udl of 2 kN/m throughout the length and two concentrated loads of 5 kN and 3 kN at a distance of 2 m and 3 m from the left end. Calculate shear force and bending moment. Draw SFD and BMD. 7

3. (a) Define shear force and bending moment. 2



Draw the SFD and BMD of the above beam. 5

(e) Derive the relationship between the elastic constants. (modulus of elasticity, (E), modulus of rigidity (G), bulk modulus (K)). 7

4. (a) Define principal stress. 2

(b) A bronze specimen has modulus of rigidity $0.598 \times 10^5 \text{ N/mm}^2$ and modulus of elasticity $1.392 \times 10^5 \text{ N/mm}^2$. Determine the Poisson's ratio of the material. 5

(c) A mild steel rod of 30 mm diameter and 420 mm long is enclosed centrally inside a hollow copper tube of external diameter 36 mm. The ends of the rod and tube are traced together and the composite bar is subjected to an axial pull of 80 kN. Find out the stresses developed in the rod and the tube. 7

Take $E_s = 2 \times 10^5 \text{ N/mm}^2$

$E_c = 1 \times 10^5 \text{ N/mm}^2$

5. (a) What is meant by core or kernel of a section? 2

