

(b) Dimensions of Symmetrical I – section beam flanges are 150mm x 20 mm; Web = 310 mm x 10 mm and overall depth is 350 mm. if the shear force acting on the section is 40 KN, find

- (i) Maximum shear stress developed in the section
- (ii) Sketch the shear stress distribution diagram

(10)

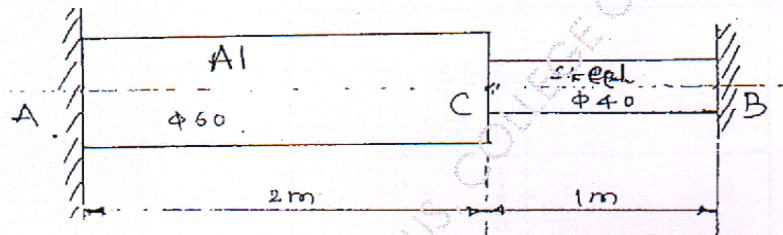
6. (a) Derive Torsion formula. State the assumptions made in the analysis

(8)

(b) Two solid shafts AC and BC of aluminium and steel are rigidly fastened together at C and attached to rigid supports at A and B. A torque of 300 Nm is applied at C. Calculate the shearing stresses in each material, angle of twist at the junction and reaction torques at A and B.

$$G_{(Al)} = 3 \times 10^4 \text{ N/mm}^2 \text{ And } G_{(Steel)} = 9 \times 10^4 \text{ N/mm}^2$$

(12)



7. (a) A cylindrical shell is 3 m long, 1 m internal diameter and 15 mm thickness. If it is subjected to an internal pressure of  $1.5 \text{ N/mm}^2$ , Calculate the maximum intensity of shear stress induced and the change in volume of the shell.  $E = 2.04 \times 10^5 \text{ N/mm}^2$ ; Poisson's ratio = 0.3

(10)

(b) From the following data, determine the thickness of cast iron column. Assume both the ends of the column are fixed.

(10)

- Length of the column = 3 m
- External diameter = 200 mm
- Safe working load = 600 KN
- Factor of safety = 5
- Ultimate compressive stress =  $570 \text{ N/mm}^2$
- Rankine constant =  $1/1600$