ESO 202A/204: Mechanics of Solids (2016-17 II Semester)
Assignment No. – 9

9.1 One diagonal of a beam of square cross-section is kept horizontal. Obtain the shear stress distribution due to shear force V (Fig 9.1). Find the magnitude and the location of the, maximum shear stress.

9.2 The cross-section of a beam is shown in Fig 9.2. It is subjected to a vertical shear force of 10 kN. Find the shear stress at level AB at the neutral axis

9.3 A beam is made of four 50 mm × 100 mm full sized Fir pieces which are glued to 25 mm × 450 mm Fir plywood as shown in Fig 9.3. Determine the maximum allowable shear force and the B.M. which the section can carry, if the allowable bending stress is 10 MPa; allowable shear stress in the wood is 0.8 MPa and allowable shear stress in the glued joint is 0.4 MPa.

9.4 Calculate the value of the shear stress τ_{xy} at the point where the web joins the flanges and at the neutral axis, if the shear force at the section is 120 kN (Fig 9.4).

9.5 The I section of a beam is subjected to a B.M. of 96 kN-m and a shear force of 32 kN. Find the state of stress at the top of the section, at 50 mm from the N.A. and at the N.A. (Fig 9.5).

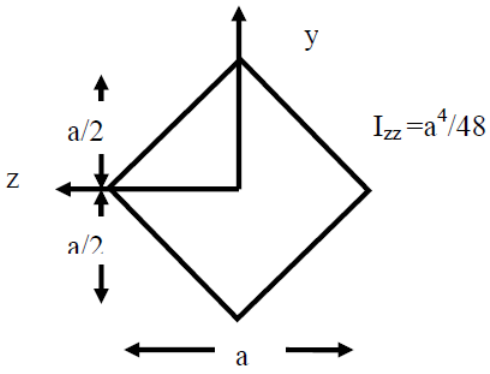

Fig. 9.1

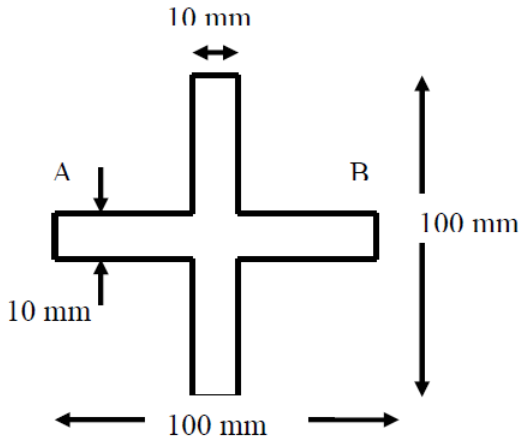

Fig. 9.2

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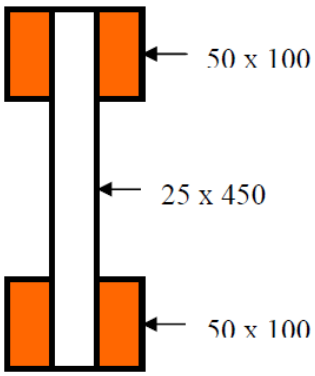

Fig. 9.3

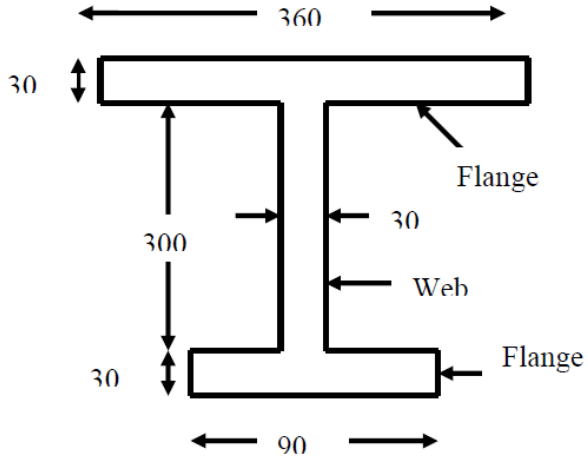

Fig. 9.4

All dimensions are in mm

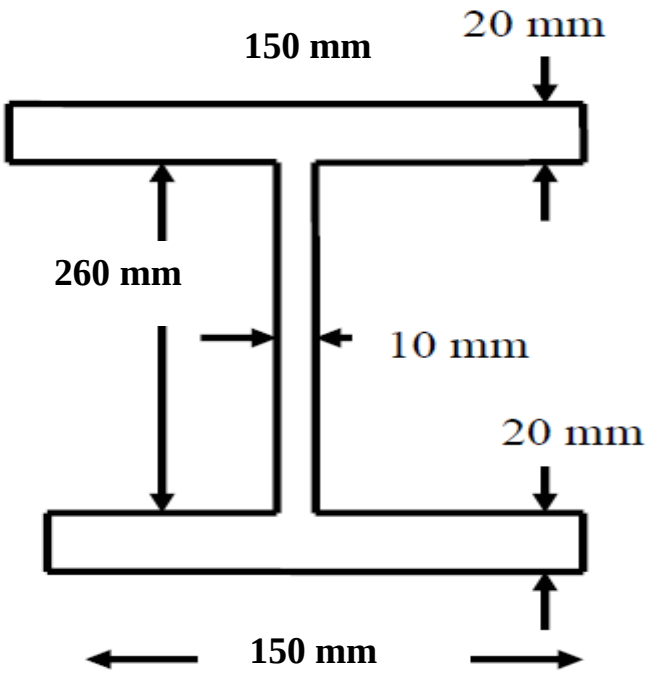

Fig. 9.5