



- (b) Design a laterally supported hot-rolled steel beam for a span of 5 meters. The beam will support a uniformly distributed load of 10 kN/m and is to be made of grade S355 steel. Use the allowable stress design method and assume a live load factor of 1.5 and a dead load factor of 1.25.
12. (a) Two plates 10mm and 20mm thick are connected by double cover butt joint made of 8mm cover plate. Record the strength of the joint, if 6 numbers of grade 4.6 are used on either sides of the joint in two rows with pitch of 60mm and edge distance of 40mm in both direction.

Or

- (b) (i) Explain the different modes of failure that can occur in bolted and welded connections. (7)
- (ii) How can mode of failures be prevented during the design and construction process? (6)
13. (a) A single angle 125mm × 75mm × 10mm is used as a tension member of a truss. The longer leg of the angle is connected to a gusset plate with 5 bolts of 20mm diameter. Determine the net effective area of the angle. Alternatively if the ends of the longer leg of the angle are welded to the gusset plate, determine the net effective area of the angle.

Or

- (b) Determine the tensile capacity of the sections shown in Fig. 13 b.

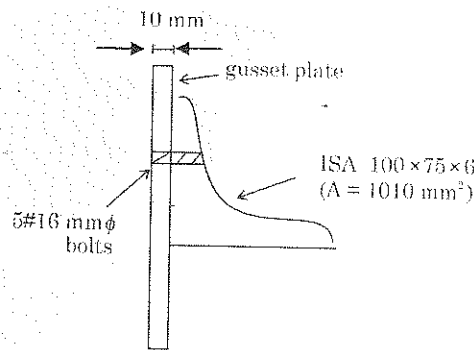


Fig 13(b)

- (i) Angles are placed on the opposite side of gusset plates (7)
- (ii) Angles are placed on the same side of gusset plates. (6)
14. (a) A rolled steel beam section IS HB 350 @ 0.674 kN/m is used as a stanchion. If the unsupported length of the stanchion is 4 m, evaluate safe load carrying capacity of the section.

Or

- (b) Explain the step by step procedure for finding the load carrying capacity of a compression member.

15. (a) Explain the step by step procedure of design of laterally unsupported rolled section as per IS 800.

Or

- (b) Find the suitable design for a simply supported beam of effective span 10 m carrying a factored load of 30 kN/m. The compression flange of the beam is laterally restrained all along and provided with stiffened end bearing of 100 mm wide. The overall depth of the beam is restricted to 450mm.

PART C — (1 × 15 = 15 marks)

16. (a) A batten column of 10-m long is carrying a factored load of 1150 kN. The column is restrained in position but not in direction at both ends. Design a built up column using channel sections placed back to back.

Or

- (b) Calculate the design bending strength of ISLB 300 @ 0.369 kN/m considering the beam, to be

(i) Laterally supported (7)

(ii) Laterally unsupported (6)

Assume the design force is lesser than the design shear strength and is of low shear. The effective length of the beam LLT is 4 m. Assume Fe410 grade of steel.