[01 – 3117]

III/IV. B.E. DEGREE EXAMINATION.

First Semester

Civil Engineering

STEEL STRUCTURES — I

(Common with Civil Environmental Engineering and Dual Degree Program in Civil Engineering)

(Effective from the admitted batch of 2008–2009)

Time : Three hours Maximum : 70 marks

Answer question No. 1 and any FOUR from the remaining seven question.

All questions carry equal marks.

Use of IS–800–2007 and steel tables may be permitted.

1. Answer the following in one or two sentences each.

   (a) Distinguish between bearing bolts and friction grip bolts.

   (b) What is the importance of Limit State Method over other methods?

   (c) What is lug angle? Why lug angles are used?

(d) Distinguish between laterally supported and unsupported beams.

(e) Draw a roof truss and sketch all the members of a truss.

(f) With neat sketches explain the different types of splices.

(g) What is a pre-engineered building?

2. Find the maximum force which can be transferred through the lap joint shown in Figure 1. Also find the efficiency of the joint. Take M20 bolts of grade 4.6 and Fe410 steel plates.

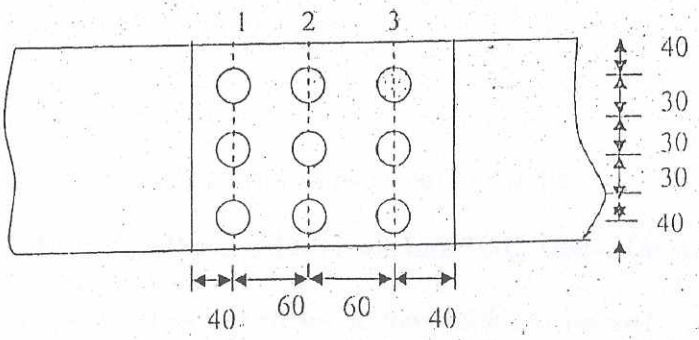

Figure – 1

3. Design a bolted connection between the flange of a column ISHB 450 @ 0.907 kN/m and a bracket plate of 10 mm thick. The bracket is carrying a load of 150 kN at an eccentricity of 0.4 m. Use M20 bolts of grade 4.6.

4. Design a tension member to transmit a pull of 150 kN. Effective length of member is 4.5 meters. Member should consist of a pair of angles connected to the one side of the gusset plate of thickness 10mm. Use 20mm bolts of grade 4.6.

5. Design a column with effective length 7 m. It is subjected to a factored load of 1500 kN. Provide two channel sections placed back to back with battens. The column may be assumed to have restrained in position but not in direction at both ends. Design suitable battening system also.

6. Design a suitable Gusseted base for a colunm section ISHB 350 @ 0.724 kN/m subjected to a factored load of 3000 kN. Base is resting on M20 concrete pedestal.

7. Design an I section purlin for a trussed roof for the following data.

Span of truss	= 12 m
Spacing of truss	= 4 m c/c
Slope of roof truss	= 20°
Wind load on roof	= 1.2 kN/m^2
Live load on the roof	= 0.5 kN/m^2
Weight of sheeting	= 0.2 kN/m^2

8. Design a laterally unsupported beam with 6 m simply supported effective span, subjected to a point load of 40 kN at mid span. Select a section of ISMB 300 mm.
