**Karunya University**

**(Karunya Institute of Technology and Sciences)**

(Declared as Deemed to be University under Sec.3 of the UGC Act, 1956)

**Supplementary Examinations – June 2016**

**Subject Title : Design of Steel Structures Time : 3 hours**

**Subject Code : 14CE2013 Maximum Marks: 100**

**Answer ALL questions (5 x 20 = 100 Marks)**

1. Design a lap joint between two plates as shown in Figure so as to transmit a factored load of 70kN using M16 bolts of grade 4.6 and grade 410 plates.

**(OR)**

2. A tie member of a truss consisting of an angle section ISA 65x65x6mm of Fe 410 grade, is welded to an 8mm gusset plate. Design a weld to transmit a load equal to the full strength of the member. Assume shop welding.

3. Determine the tensile strength of a roof truss member 2 ISA 90x60x6mm connected to the gusset plate of 8mm thickness by 4mm weld .The effective length of weld is 200mm.

**(OR)**

4. Determine the design axial load capacity of the column ISHB 300 @ 577N/m if the length of column is 3m and its both ends pinned.

5. A steel column of ISHB 300 @ 577N/m supports a total factored load of 1000kN. Design a slab base for the column. The column is supported on a pedestal made of M20 concrete.

**(OR)**

6. A roof of hall measuring 8m x 12m consists of 100m thick R.C slab supported on steel I- beam spaced 3m apart as apart as shown in Figure. The finishing load may be taken as 1.5kN/m2 and live load as 1.5kN/m2. Design the steel beam.

[P.T.O]

7. An ISMB 500 section is used as a beam over a span of 6m, with simply supported ends. Determine the maximum factored uniformly distributed load that the beam can carry if the ends are restrained against torsion but compression flange is laterally unsupported.

**(OR)**

8. A non-sway column in a building frame with flexible joints is 4m high and subjected to the following load and moment

Factored axial load = 500kN

Factored moment Mz at the top of column = 27 kNm

At bottom of column = 45 kNm

Design a suitable beam-column assuming fy= 250N/mm2. Take the effective length of the column as 0.8L along both the axes.

**Compulsory:**

9. Determine the wind pressure to be considered for a shed in the outskirts of Bangalore.

Given:

Structure: General purpose with probable life of 50 years

Terrain Category: I, Building Class B.

Eye Board Height: 11m

Topography: Plain area