

Roll No. ....

**2264**

**B.E. 5th Semester (Civil Engg.)**

**Examination– December, 2013**

**DESIGN OF STEEL STRUCTURE-I**

**Paper : CE-301-E**

**Time : Three hours ]**

**[ Maximum Marks : 100**

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt any *five* questions. All questions carry equal marks. Use of IS 800-1984 or 2007 is allowed. Use of Steel Table is allowed.

1. What are the advantage and disadvantage of steel as a structural material ? Also explain the Stress-Strain curve for Mild Steel with diagram. 20
2. (a) What do you mean by Bolted Connection ? Explain the types of Bolt with diagram. 10  
(b) Design a riveted joint to connect two plates 14 mm thick. Power driven rivets may be used for making the connection. Assume  $f_y = 250 \text{ N/mm}^2$ . 10

3. A bridge truss diagonal carries a pull of 200 kN. The length of the diagonal is 3.0 m. Design a suitable section. The member is connected to a gusset plate 14 mm thick. Assume  $f_y = 250 \text{ N/mm}^2$ . 20
4. (a) What do you mean by Built up columns? What is its necessity? 10
- (b) Design a double angle discontinues strut to carry a load of 90 kN. The length of the strut is 3.0 m between intersections. The two angles are placed back to back (with long legs connected) and are back riveted: 10
- (i) Angles are placed on opposite sides of 12 mm gusset plate.
- (ii) Angles are placed on same side of 12 mm gusset plate.
5. Design the section of steel columns and a suitable base for an axial compressive force of 3500 kN. The effective length of the column is 5.2 m. The safe bearing pressure from concrete may be assumed to be  $3.75 \text{ N/mm}^2$ . 20
6. A conference hall 8 m x 18 m is provided with a 120 mm R.C.C. slab over rolled steel beam spaced 3 m c/c. A wearing coat of 100 mm average thickness is provided. The compression flange of the beam is

laterally supported throughout. Design the beam section. Assume  $f_y = 260 \text{ N/mm}^2$ . 20

7. What do you mean by Gantry girder ? What are the different loads to be considered for the design of gantry girder ? Explain in detail. 20

8. A welded plate girder has the following elements :

Flange plate  $400 \times 16 \text{ mm}$ . One plate for each flange

Web  $2000 \times 10 \text{ mm}$ .

Compute the sectional properties and moment of resistance of the plate girder. Design also the bearing stiffeners, if the plate girder is to carry to uniformly distributed load of  $120 \text{ kN/m}$ . 20