C 22568 (Pages : 2) Name.....

Reg. No.....



**SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE (2014 SCHEME) EXAMINATION, APRIL 2017**

Civil Engineering

CE 14 601—STRUCTURAL DESIGN—II

Time : Three Hours Maximum : 100 Marks

(*Use of* IS 800, IS 875, *Steel tables are permitted.*)
[*Assume suitable data if not given*]

**Part A**

*Answer any* **eight** *questions.*
*Each question carries* 5 *marks.*

1. Write short notes on simple, rigid and semi-rigid joints ?
2. Explain the types of welded joints.
3. What is meant by Lug angle and Explain its design steps ?
4. Explain about Laced Column and its design.
5. Design a slab base for a column ISHB 350 subjected to an factored axial compressive load of 1500 kN. Load is transferred to the base plate by direct bearing of column flanges. The base rest on concrete pedestal of grade M 20.
6. Explain Web buckling and Web crippling of beam.
7. Difference between Laterally supported Beam and Laterally unsupported Beam And Explain it difference in design.
8. Explain the Welded eccentric connections and its design steps.
9. Write notes on Types of roof trusses, their selection and suitability.
10. Explain the Loads Considered in Design of Truss.

(8 × 5 = 40 marks)

**Part B**

*Answer* **all** *questions.*

11. (a) The tension member of a truss consists of two angles ISA 90 × 90 × 6, If the two angles are welded on either side of a gusset plate at the joint. Design the joint. Axial tension in the member is 250 kN. Use 6 mm. fillet weld.

*Or*

(b) An angle section 8 mm. thick carrying 120 kN factored load is to be connected to a gusset plate (lap joint) using M 20 bolts of grade 4.6. Find the number of bolts required and sketch the connection details. And also find efficiency of bolted Joint.

**Turn over**

12. (a) Design a double angle tension member connected on each side of a 10 mm. thick gusset plate, to carry an axial factored load of 400 kN. Use 20 mm. black bolts. Assume shop connection.

*Or*

(b) A column 4 m. long has to support a factored axial load of 6000 kN. The column is effectively held at both ends and restrained in direction at one ends. Design the column using standard rolled sections and plates.

13. (a) A simply supported beam is to carry a load of 20 KN/m. The beam ends are resting on 250 mm. thick walls with bearing plates with clear span as 6.25 m. The beam supports a floor slab. Design the beam with steel of yield stress 250 MPa.

*Or*

(b) Design a suitable bolted bracket connection of a ISHT-75 section attached to the flange of a ISHB 300 at 577 N/m. to carry a vertical factored load of 600 kN at an eccentricity of 300 mm. Use M24 bolts of grade 4.6

14. (a) Design an I section purlin for a building situated in Chennai. Spacing of truss C/C = 6 m. span of truss = 12 m. Spacing of purlin C/C = 1.5 m. Intensity of Wind pressure = 2 kN/ $m^2$ , Weight of galvanised sheet (including fixtures) = 170 N/$m^2$. Slope of roof = 30°.

*Or*

(b) An electrically operated overhead travelling crane is to be used in a bay of an industrial building. The gantry girder has the following data : Crane capacity = 25 tonne, Bay width = 15 m, Minimum approach of crane hook = 1.1 m, Wheel base = 3.5 m, Spacing of column = 9 m, Weight of crane girder = 200 kN, Weight of trolley = 5 tonne, Mass of rail section = 0.3 kN/m, Height of rail section = 0.75 m. Determine the maximum moment and shear force due to vertical and horizontal load.

(4 × 15 = 60 marks)