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**Question Paper Code : 31212**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Civil Engineering

CE 2352/CE 62/CE 1354/10111 CE 603 — DESIGN OF STEEL STRUCTURES

(Regulation 2008/2010)

(Common to PTCE 2352 – Design of Steel Structures for B.E. (Part-Time)  
Fourth Semester – Civil Engineering – Regulation 2009)

Time : Three hours

Maximum : 100 marks

Use of IS 800–2007, Steel Tables and IS 875–Parts 1,2 & 3 are permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. How is efficiency of a bolted connection estimated?
2. What do you understand by prying action?
3. What is block shear failure?
4. What are lug angles?
5. Write the steps in the design of a column slab base connection.
6. What is the significance of column buckling curves?
7. What is web buckling?
8. List the factors governing flange curtailment in plate girders.
9. On what basis is live load considered in the design of roof truss?
10. Give the serviceability criteria for the design of gantry girders.

PART B — (5 × 16 = 80 marks)

11. (a) Design a lap joint to connect two plates of thickness 10mm and 12mm respectively to carry a factored load of 150 kN. Use 16mm diameter 4.6 grade bolts and Fe410 grade steel. Also find the efficiency of the joint.

Or

- (b) ISA 90 × 90 × 10mm is connected to a gusset plate 12mm thick by welding. The member carries an axial factored load of 200 kN. Design the welded connection providing weld on all three sides using site welds. Use Fe410 grade steel.
12. (a) Find the tensile load carrying capacity of 2ISA 75 × 75 × 8mm placed back to back of a 10mm thick gusset plate using a single row of 4 nos. –16mm diameter bolts at a distance of 40mm from the toe of the angle. Take pitch = 50mm and end distance = 30mm. The length of the member is 4m. Use Fe410 grade steel.

Or

- (b) Design a tension member to carry a factored tensile load of 300 kN. The 3m long tension member is connected to a gusset plate 16mm thick with one line of 20mm diameter bolts of grade 4.6. Use Fe410 grade steel.
13. (a) Find the axial load carrying capacity of a stanchion 1SMB 300, 5m high. The column is pinned at both the ends.  $f_y = 250$  MPa.

Or

- (b) Design a column to carry a factored axial compressive load of 500 kN. The effective length of the column is 4m.  $f_y = 250$  MPa.
14. (a) Design a simply supported laterally restrained beam of effective span 4m carrying a factored point load of intensity 50kN at the midspan. Design an appropriate section using Fe 410 grade steel.

Or

- (b) Design a laterally unsupported beam of 4m effective span, carrying a factored bending moment of 350 kNm and factored shear force of 100 kN. Use Fe 410 grade steel.
15. (a) Explain in detail the steps involved in the design of gantry girder.

Or

- (b) Design the purlin for a roof truss of an industrial building located at Chennai with a span of 15m and length of 60m. The roofing is AC sheeting. The terrain is an open industrial area. Building is class B building with a clear height of 8m at the eaves. Design for 1.5 (DL + WL) combination. Type of truss and roof slope can be assumed.