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Question Paper Code : 41011

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

Sixth Semester

Civil Engineering

080100037 – DESIGN OF STEEL STRUCTURES

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

(Use of IS 800-2007, IS 883-1994 and steel tables are permitted)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define gauge distance of rivets.
2. What are the advantages of bolted connections?
3. Draw any two forms of tension members.
4. What is a tension splice?
5. Define slenderness ratio.
6. What are the possible failure modes of axially loaded columns?
7. Classify the Section ISMB 350.
8. What are built up beams?
9. List the factors affecting the economical spacing of roof truss.
10. What is the function of purlins?

PART B — (5 × 16 = 80 marks)

11. (a) Lap joint is used to connect plates 16 mm thick. Design the riveted joint and determine its efficiency. Use Fe4w grade steel. The joint is to transfer a factored load of intensity 300 kN.

Or

- (b) Two plates 10 mm and 18 mm thick are to be joined by a double cover butt joint. Assuming cover plates of 8 mm thickness, design the joint to transmit a factored load of 450 kN. Assume Fe410 plate and grade 4.6 bolt.

12. (a) Design a single angle section for a tension member of a roof truss to carry a pull of 100 kN. The member is subjected to possible reversal of stress due to action of wind. The length of member from centre to centre of intersection is 3.5 m.

Or

- (b) In a truss girder of a bridge, a diagonal consists of mild steel flat 400F16 and it carries a pull of 750 kN. Design a suitable splice for the member.
13. (a) A single angle discontinuous strut ISA 150 × 150 × 12 mm (ISA 150150, @ 0.272 kN/m) with single riveted connection is 3.5 m long. Calculate the safe load this strut can carry.

Or

- (b) Design column to carry a factored load of 1100 kN. The column is 4m long and adequately restrained in position but not in direction at both ends. Use $f_y = 250$ MPa.
14. (a) Design a simply supported laterally restrained beam to carry a UDL of 44 kN/m. The effective span of beam is 8 m. Assume a bearing length of 75 mm.

Or

- (b) A proposed cantilever beam is built into a concrete wall. It supports a dead load of 22 kN/m. The length of beam is 6m. Select a suitable section with necessary checks. Assume stiff bearing length of 100 mm. The beam is laterally unsupported.
15. (a) Design an angle purlin for a roof with the following data :

Span of the truss = 8m

Spacing of trusses = 4 m c/c

Pitch of truss = 1/4

Spacing of purlins along the slope of truss = 1.20 m c/c

Roof covering = Asbestos sheets

Basic wind pressure = 1.01 kN/m^2 .

Or

- (b) A 10 m × 50 m godown is to be covered by roof trusses. Propose a suitable type of roof truss for the purpose and design the various members of the truss.