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Question Paper Code : 60260

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Sixth Semester

Civil Engineering

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

(Regulations 2008/2010)

(Common to PTCE 2352/10111 CE 603 — Design of Steel Structures for B.E. (Part-Time) Fourth Semester – Civil Engineering – Regulations 2009/2010)

Time : Three hours Maximum : 100 marks

Use of IS 800-2007, IS 883-875-1994 and steel tables is permitted.

Relevant data may be suitably assumed if found necessary.

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are the advantages of welded connection?

2. What are the advantages of a welded connection when compared to bolted connection?

3. How is shear lag accounted for in IS 800-2007?

4. What do you understand by 'net area' of a section?

5. What is the effective length of a compression member?

6. When do you go for gusseted plates?

7. What is web buckling?

8. List the factors governing flange curtailment in plate girders.

9. How do you calculate the wind load while designing roof trusses?

10. What are the different components of a roof truss?

PART B — (5 × 16 = 80 marks)

11. (a) Design welded end connections for a tension member consisting of a channel ISMC 300 to develop full strength of the member. The length of the joint is limited to 25 cm.

Or

(b) A single riveted lap joint is used to connect plate of 12 mm thick if 22 mm dia. Power driven rivets are used at 70 mm spacing. Determine the strength of the joint and its efficiency.

12. (a) Compute the tensile capacity of a truss member ISA 100 × 100 × 10mm connected to a 12mm thick gusset plate. The member is connected by one line of 5 nos. of 16mm diameter bolts of grade 4.6.

Or

(b) Design a truss diagonal subjected to a factored tensile load of 250 kN. The length of the diagonal is 3m. The tension member is connected to a gusset plate 16mm thick with one line of 16mm diameter bolts of grade 4.6.

13. (a) Find the axial load carrying capacity of a stanchion ISMB 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) A simply supported beam of 5 m span carries a factored load of 80 kN/m over the entire span. The compressive flange is fully restrained. The rolled steel section available is ISMB 300. Check whether the section is sufficient to resist the moment.

Or

(b) Design a laterally unsupported beam simply supported over a span of 2m. It carries UDL of 56 kN/m.

15. (a) Design a purlin using the following data.
    (i) Spacing of roof trusses = 4.5 m c/c
    (ii) Purlin spacing = 1.8 m c/c
    (iii) Pitch of Roof = 1/4
    (iv) Span of the roof = 10 m
    (v) The vertical load from roof sheets = 180 N/m².
    (vi) Wind load intensity normal to roof 1200 N/m²
    Use I section. (16)

Or

(b) Write down the step by step procedure of design of gantry girder. (16)

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