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Question Paper Code : 21212

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 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 Steel Tables are permitted.

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Classify the structures based on shape and geometry.

2. What is reverting?

3. List out different types of tension steel members.

4. Write down the expression for calculating the net effective areas for angles and tees in tension.

5. Define slenderness ratio.

6. Define effective length of column.

7. What is called beam column?

8. Enlist the purposes of providing bearing stiffeners.

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

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

PART B — ($5 \times 16 = 80$ marks)

11. (a) Design a doubly bolded lap joint for plates 16 mm thick to carry its full load. Take permissible axial tension in plate 150 N/mm^2. (16)

Or

(b) A 100 mm × 10 mm plate is to be welded to another plate 150 mm × 10 mm by the fillet welding on three sides. The size of the weld is 6 mm. Find out necessary over lap of the plate, for full strength of the joint. Take allowable tensile stress in plate equal to 150 N/mm^2 and allowable stress in weld as 110 N/mm^2. (16)

12. (a) An angle section 500 × 30 × 6 mm is used as a tension member with its longer leg connected by 12 mm diameter rivets. Calculate its strength. Also calculate its strength when if it is fillet welded. Take permissible stress in axial tension as 150 N/mm^2. (16)

Or

(b) Design a tension splice to connect two plates of size 250 mm × 20 mm and 220 mm × 12 mm, for a design load of 250 kN. (16)

13. (a) Design a steel column of rolled steel I section to carry an axial load of 500 kN. The column is 4 m long and it is effectively held in position at both ends but restrained against at one end only. Take yield stress in steel as 250 N/mm^2.

Or

(b) Design a build up column composed of two channel sections placed back to back, carrying an axial load of 1345 kN. Effective length of column is 5.95 m.Take $f_Y = 250\ \text{kN/mm}^2$. (16)

14. (a) A laterally supported beam having an effective span of 8 m consists of ISMB 550 @ 103.7 kg/m and covet plate of 250 mm × 16 mm connected to each flange by 20 mm diameter rivets. Determine the safe UDL which the beam can carry in addition of its own weight. (16)

Or

(b) A reverted plate girder is simply supported over an effective span of 16 m. It carries a uniformly distributed load of 80 kN/m in addition to its self weight. And two point loads of 400 kN each at 4 m from their supports. Design the web and flanges. (16)

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/m^2

(vi) Wind load intensity normal to roof = 1200 N/m^2

Use I section. (16)

Or

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

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