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Question Paper Code : 21260

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

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 × 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. What are all the various types of bolts?
4. What is the permissible stress in axial tension?
5. Define slenderness ratio.
6. What is the purpose of gusset plate?
7. What is web buckling?
8. Define web splice and where it is provided.
9. List the various components of a roof truss.
10. What is the purpose of principal rafter in a 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) Design a tension member using two angle section to carry 180 kN when both angles are connected

- (i) on both sides of the gusset plate and
(ii) on the same side of the gusset plate.

Or

- (b) 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 the member from centre to centre of intersection is 3.5 m.

13. (a) A built up column made of ISMC 350 @ 38.8 kg/m placed back to back such that the distance between centroids is 300 mm. If the column carries 1400 kN load, design a laced system for the column for an effective length of 6m take yield stress as 250 MPa.

Or

- (b) A built-up column consists of ISHB 400 @ 77.4 kg/m with one 300 × 15 mm flange plate on either side. The column carries an axial load of 2500 kN. Design the gusseted base, if the column is supported in concrete pedestal with a bearing capacity of 5 N/sq.mm.

14. (a) A welded plate girder has a simply supported span of 20m it carries a UDL of 100 kN/m inclusive of its weight and two concentrated loads of 100 kN each at 4m from either side. The depth of the plate girder is restricted to 1.5 m due to head room requirement. Design a suitable section.

Or

- (b) A steel beam is supported at its ends and carries a UDL of 55 kN/m length excluding self weight. The effective span of the beam is 8m. Design a suitable section for the beam. Check the safety of the beam for web crippling and web buckling.

15. (a) Design an angle purlin for a roof with the following data:

Span of truss	:	8 m
Spacing of truss	:	4m c/c
Pitch of truss	:	1/4
Spacing of purlins along the slope truss	:	2 m c/c
Roof coverings	:	Asbestos sheets
Basic wind pressure	:	1.5 kN/sq.m

Or

(b) Explain the procedure for the design of gantry girder.
