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Question Paper Code : X 60259

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020

Sixth Semester

Civil Engineering

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

(Regulations 2008/2010)

[Common to PTCE 2352/10111CE603 – 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. Write short notes on limit state of serviceability.
2. List the advantages of welded connections.
3. What is block shear failure ?
4. What are lug angles ?
5. Define slenderness ratio.
6. Define effective length of column.
7. What do you mean by “Shape factor” ?
8. Where bearing stiffeners are 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 a lap joint to connect two plates of thickness 10 mm and 12 mm respectively to carry a factored load of 150 kN. Use 16 mm diameter 4.6 grade bolts and Fe410 grade steel. Also find the efficiency of the joint. (16)

(OR)

- b) ISA $90 \times 90 \times 10$ mm is connected to a gusset plate 12 mm 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. (16)
12. a) An angle section $500 \times 30 \times 6$ 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 $250 \text{ mm} \times 20 \text{ mm}$ and $220 \text{ mm} \times 12 \text{ mm}$, for a design load of 250 kN. (16)
13. a) Design a column using with two channel sections laced together and placed toe-to-toe and spaced apart to support a factored axial load of 2500 kN. The effective length of the column is 5 m. (16)

(OR)

- b) Design a single angle discontinuous strut to carry a factored load of 120 kN. The length of the strut between centre of intersections is 3.3 m. (16)
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. (16)

(OR)

- b) Design a laterally unsupported beam simply supported over a span of 2 m. It carries UDL of 56 kN/m. (16)



15. a) Design an angle purlin for a roof with the following data : **(16)**

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

(OR)

b) Explain the procedure for the design of gantry girder. **(16)**
