Reg. No. : | | | | | | | | | | | |

C 3144

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Sixth Semester

(Regulation 2004)

Civil Engineering

CE 1352 — DESIGN OF STEEL STRUCTURES

(Common to B.E. (Part-Time) Fifth Semester Regulation 2005)

Time : Three hours Maximum : 100 marks

Use of IS 800, Steel Tables are permitted.

Answer ALL questions.

PART A – (10 × 2 = 20 marks)

1. Define Efficiency of Riveted Joint.

2. What is the effective throat thickness of a fillet weld?

3. Give the sketches of tension members with built-up sections.

4. What are Lug angles?

5. Where should the splice plate be located in a column?

6. What are the assumptions made while designing a column?

7. What is meant by lateral buckling of beams?

8. Why antailment of the flange plates is done?

9. Which section is best suited for a purlin.

10. How is the selection of section made for roof truss elements?

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PART B — (5 × 16 = 80 marks)

11. (a) Two sections 10 mm and 18 mm thick are to be jointed by double cover butt joint. The joint is double rivetted with cover plates each 8 mm thick. The load to be transferred by the joint is 500 kN. Design the joint and rivets on packings.

Or

(b) A tie member consisting of angle section ISA 80 mm × 50 mm × 8 mm (fy = 250 mPa) is welded to a 12 mm gusset plate. Design welds to transmit a load equal to the full strength of the member.

12. (a) A diagonal member of a roof carries a maximum axial pull of 300 kN. Design the section and the connections with a 14 mm gusset plate. The length on the gusset plate available for making the connection is 310 mm. Design the lug angle also if required. The steel is of yield stress of 250 N/mm^2.

Or

(b) Design a splice for tension member sections 160 × 10 mm and 250 × 14 mm. The member is subjected to a pull of 200kN. Assume f_y=250N/mm^2.

13. (a) Design a column to support an axial load of 700 kN. The column has an effective length of 7 m with respect to the x-axis and 5m with respect to the y-axis.

Or

(b) A column section ISHB 350 @ 674 N/m carries an axial load of 1100 kN. Design a suitable gusset base. Allowable bearing pressure on concert is 4000 kN/m^2.

14. (a) Design a beam of effective span 6m and subjected to a bending moment of 105.3 × 10^6 Nmm for the condition that the compression flange is laterally unsupported throughout.

Or

(b) Design a welded plate girder 24 m in effective span and simply supported at the two ends. It carries a uniformly distributed load of 100 kN/m. Check the stresses and design the bearing stiffener.

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15. (a) Design a purlin for a roof truss having the following data.

Span to truss = 6 m

Spacing of truss = 3 m centre to centre

Inclination of roof = 30

Spacing of purlins = 2 m centre to centre.

Wind pressure = 1.5 kN/m^2

Roof coverage = A.C. sheets weighing 200 N/m^2

provide channel section purlin.

Or

(b) Design a gantry girder to be used in an industrial building carrying an electric overhead travelling crane, for the following data.

Crane capacity = 200 kN

Self wt. of the crane girder excluding trolley = 200 kN

Self wt. of the trolley, electric motor, hook, etc = 40 kN

Approximate minimum approach of the crane hook to the gantry girder = 1.2 m.

Wheel base = 3.5 m

c/c distance between gantry rails = 16 m

c/c distance between columns (span of gantry girder) = 8 m

Self weight of rail section = 300 N/m

Yield stress of steel = 250 N/mm^2

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