Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 71587

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Sixth Semester

Civil Engineering

CE 6603 — DESIGN OF STEEL STRUCTURES

(Regulations 2013)

Time : Three hours   Maximum : 100 marks

Use of IS 800 – 2007 IS 875 – Part 3 and Steel Tables is permitted.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Define nominal diameter of rivet.

2.   What is meant by pitch of rivet?

3.   What are the various types of tension members?

4.   What is net sectional area?

5.   What is meant by a strut?

6.   What are the assumptions made in Euler's analysis?

7.   What is meant by slender section?

8.   What are the classifications in stiffeners?

9.   Draw neat sketches of various types of roof trusses.

10. List the various forces acting on a gantry girder.

PART B — (5 × 16 = 80 marks)

11. (a) A tie member 75 mm × 8 mm connected to a 10 mm thick gusset plate is to transmit a load of 90 kN. Design the fillet weld and calculate the necessary over lap. Assume site welding.

Or

(b) A single bolted double cover butt Joint is used to connect two plates of 8 mm thickness. Assuming 20 mm bolts at 50 mm pitch, calculate the efficiency of the joint. The thickness of cover plate is 4 mm.

12. (a) Determine the tensile strength of a roof truss diagonal 100 × 75 × 10 mm connected to the gusset plate by 4 nos. of 20 mm diameter power driven rivets in one row along the length of the member. The short leg of the angle is kept outstanding.

Or

(b) A bridge truss diagonal carrier an axial bull of 300 kN. Two mild steel flats 250 ISF 10 and ISF 18 of the diagonal are to be joined together. Design a suitable splice.

13. (a) Design a built up column 6 m long to carry a load of 400 kN. The column is restrained in position but not in direction at both the ends. Provide single angle lacing system with bolted connections.

Or

(b) A built up column consists of ISHB 400 @ 77.40 kg/m with one 300 mm× 12 mm flange plate on each side. The column carries an axial load of 2600 kN. Design a gusseted base if the column is supported on concrete pedestal with a bearing pressure of 5 N/mm^2.

14. (a) Design a laterally restrained simply supported beam to carry a uniformly distributed load of 44 kN/m. The effective span of the beam is 8 m. A bearing length of 75 mm is provided at the supports.

Or

(b) Design a rolled steel I section for a simply supported beam with a clear span of 6 m. It carries a U.D.L. of 50 kN/m exclusive of self weight of the girder. The beam is laterally unsupported.

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

Span of the truss = 6 m

Spacing of the truss = 3 m c/c

Inclination of the roof = 30

Spacing of purlin = 2 m c/c

Wind pressure = 1.5 kN/m²

Roof coverage = A.C sheeting weighing 200 N/m²

Provide a channel section purlin.

Or

(b) (i) List out various elements of the roof truss and give their design requirements. (8)

(ii) Explain the design principles of Gantry Girder. (8)

———