Reg. No. :

Question Paper Code: 1036272

B.E. / B.Tech. DEGREE EXAMINATIONS, NOV / DEC 2024
Sixth Semester
Civil Engineering
U20CE603 – DESIGN OF STEEL STRUCTURES
(Regulation 2020)

Time: Three Hours   Maximum: 100 Marks

Answer ALL questions

PART – A   (10 x 2 = 20 Marks)

1.   Point out the types of failures occur in a riveted joints.

2.   Define slip factors.

3.   Sketch any two typical cross section member using angle sections.

4.   List out the typical failure modes in tension member.

5.   Define the term strut.

6.   Illustrate the slenderness ratio of a compression member.

7.   Explain the term laterally unsupported beam with an example.

8.   Define the panel buckling.

9.   Draw a neat sketch with various components in the steel roof truss.

10.   List out the considerations for selection of a suitable type of truss.

PART – B   (5 x 16 = 80 Marks)

11. (a) Design a single bolted double cover butt joint to cover butt joint to connect boiler plates of thickness 12 mm for maximum efficiency. Use M16 bolts of grade 4.6 boiler plates are of Fe 410 grade. Find the efficiency of the joint.   (16)

(OR)

(b) A tie member consists of two ISMC 250.the channels are connected on either side of a 12 mm thick gusset plate. Design the welded joint to develop the full strength of the tie. However the overlap is to be limited to 400 mm.   (16)

12. (a) Determine the design tensile strength of 160 x 8 mm plate with the holes for 16 mm bolts as shown in fig. plates are of steel, grade Fe415. (16)
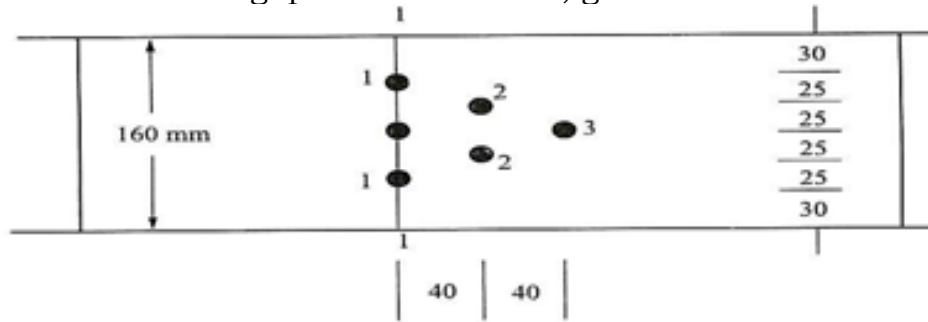
(OR)

(b) Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 225KN. the member is subjected to the possible reversal of stress due to the action of wind. The length of the member is 3m. Use 20mm shop bolts of grade 4.6 for the connection. (16)

13. (a) A column section ISHB 300@577 N/m is carrying a factored axial load of 600 kN. A factored moment of 30N-m and a factored shear force of 60 kN. Design a suitable column splice. Assume ends are milled. (16)

(OR)

(b) Design a slab base for a column ISHB 300 @577N/m carrying an axial factored load of 1000 kN. M20 concrete is used for the foundation. Provide welded connection between column and base plate. (16)

14. (a) Design a simply supported beam of effective span 1.5 m carrying a factored concentrated load of 360 kN at mid span. (16)

(OR)

(b) Design a simply supported beam of 10m effective span carrying a total load of 60 kN/m. The depth of beam should not exceed 500mm. the compression flange of the beam is laterally supported by floor construction. Assume stiff end bearing is 75 mm. (16)

15. (a) Design angle purlin for the following data by simplified method:
Spacing of trusses = 4 m
Spacing of purlins = 1.6 m
Weight of A.C sheets including laps and fixtures=0.205kN/m Live load=0.6 kN/m
Wind load=1 kN/m^2
Inclination of main rafter of truss=21° (16)

(OR)

(b) A roof truss shed is to be built in Lucknow for an industry. The size of shed is 24 m x 40 m. The height of building is 12m at the eves. Determine the basic wind pressure. (16)

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