C

Question Paper Code: 96102

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Sixth Semester

Civil Engineering

19UCE602- DESIGN OF STEEL STRUCTURES

(Regulations 2019)

(Use of IS 800:2007, SP 6-1:1964, Steel Tables, IS: 875 (Part I to V) - 1987(Reaffirmed 2003) codes are permitted)

Duration: Three hours   Maximum: 100 Marks

PART A - (5x 1 = 5 Marks)

Answer All Questions

1. Partial Safety factor for resistance governed by yielding γ_{mo} as per IS code is   CO1- U

    (a) 1.10   (b) 1.25   (c) 1.50   (d) 1.15

2. A member carrying direct tension is called   CO2- U

    (a) Strut   (b) Tie   (c) Tension member   (d) Compression member

3. A column splice is used to increase   CO1- U

    (a) Length of the column   (b) Strength of the column

    (c) Cross- sectional area of the column   (d) Cross-sectional dimension of the column

4. Members used to carry wall loads over wall openings are called   CO1- U

    (a) purlin   (b) rafter   (b) girder   (d) lintels

5. The maximum spacing of vertical stiffeners is   CO1- U

    a) 1.33 d   b) 1.4d   c) 1.5 d   d) 1.75 d

PART – B (5 x 3= 15Marks)

6. Sketch and define the pitch(p), gauge(g), staggered pitch (ps) edge distance(e)–Use IS 800 - 2007   CO1- U

7. Explain the shear lag effect an d illustrate the shear lag width of bolted and welded equal angle section as per IS 800 - 2007   CO2- App

8. Sketch the variation between single and double lacing system with the aid of IS Code   CO2- App

9. When will complex stresses arrived?   CO2- App

10. Draw the elements of a roof truss   CO2- App

<p align="center">PART – C (5 x 16= 80Marks)</p>

11. (a) Design the following joints between two plates of width 200 mm and thicknesses 10 mm and 18 mm respectively to transmit a factored load of 150 kN. Analyze the efficiency of connection with Lap joint . Use plates of Fe 410 grade steel and 16 mm diameter bolt of grade4.6   CO3-Ana   (16)

<p align="center">Or</p>

(b) Design the following joints between two plates of width 200 mm and thicknesses 10 mm and 18 mm respectively to transmit a factored load of 150 kN. Analyze the efficiency of connection with Single cover butt joint with cover plate of 8 mm. Use plates made of Fe 410 grade steel and 16 mm dia bolt of grade 4.6.   CO3-Ana   (16)

12. (a) Two ISA 75×50×8 are connected to a gusset plate on its same side of thickness 10mm by four M18 grade 4.6 bolts. Analyze the design tensile strength of the angle if (1) gusset is connected to the longer leg (2) gusset is connected to the shorter leg and state which connection perform more tensile strength.   CO3- Ana   (16)
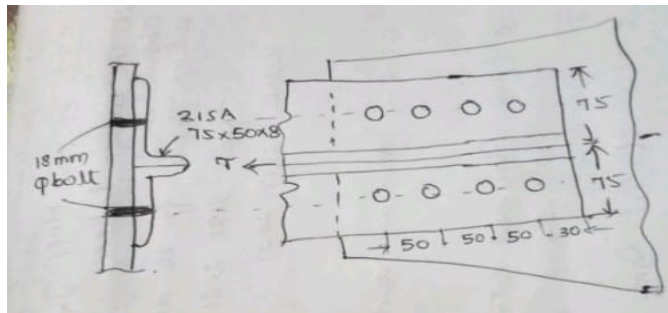
<p align="center">Or</p>

(b) Design a tension splice to connect two tension member plates of size 200 × 10 and 220 × 12. The member is subjected to a factored tensile force of 280 kN. Use M20 grade 4.6 ordinary bolts for the connection and analyze the suitability of 4 mm thick splice plate .   CO3- Ana   (16)

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13. (a) Sketch and specify the general requirements and design requirements considering while designing of Lacing plates for a compression member and also mention the clause of IS800 - 2007 CO2-App (16)

Or

(b) Sketch and specify the general requirements and design requirements considering while designing of batten plates for a compression member and also mention the clause of IS800 - 2007 CO2-App (16)

14. (a) A cantilever beam of length 4.5 m supports a dead load (including self weight) of 18 kN/m and a live load of 12 kN/m. Assume a bearing length of 100 mm. Design the beam CO2-App (16)

Or

(b) Write down the step by step procedure for the design of laterally supported beam with the reference clause of IS 800 - 2007 CO2-App (16)

15. (a) Write down the design procedure of a channel section purlin with the reference clause of IS 800 - 200 CO2-App (16)

Or

(b) Write step by step procedure for the design of a simply supported gantry girder to carry electric overhead travelling crane CO2-App (16)

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