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Question Paper Code: 56103

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Sixth Semester

Civil Engineering

15UCE603- DESIGN OF STEEL STRUCTURES

(Regulation 2015)

Use of IS 800:2007, IS 875 (Part I, II & III, IV & V):1987 and SP 6-1:1964 are permitted

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Poisson's ratio of steel in the elastic range is CO1- R
(a) 0.25 (b) 0.30 (c) .040 (d) .50
2. The weakest plane in a fillet weld is. CO2- R
(a) smaller of the sides (b) throat
(c) side parallel to the force (d) side normal to the force
3. The deformation in the direction normal to the load axis is known as CO3- R
(a) crippling (b) buckling (c) winding (d) booming
4. The exterior beams at the floor level of buildings which carry part of the floor load and exterior wall is known as CO4- R
(a) spandrels (b) rafter (c) joist (d) girt
5. The least permissible clear dimension of the web of thickness t in the panel of a plate girder, is restricted to CO5- R
(a) 150t (b) 160t (c) 170t (d) 180t

PART – B (5 x 2= 10Marks)

6. Why LSD is preferred than WSD? CO1- R
7. Define tension member CO2- R
8. Define effective length of a column CO3- R

9. How the steel sections are classified with respect to its flexural properties.. CO4- R
10. Quote the significance of plate girders. CO5- R

PART – C (5 x 16= 80Marks)

11. (a) The plates of a 6mm thick tank are connected by a single bolted lap joint with 20mm diameter bolts at 60mm pitch. Calculate the efficiency of the joint. Take f_u of the plate as 410 MPa and assume 4.6 grade bolts. CO1- App (16)

Or

- (b) Design a connection to joint two plates of size 250 X 12 mm of grade Fe 410, to mobilize full plate tensile strength using shop fillet welds, if CO1- App (16)
- (i) a lap joint is used
- (ii) a double cover butt joint is used.

12. (a) Determine the design tensile strength of the angle ISA100 75, 8 mm with 6 nos of 20 mm bolts if the longer leg is outstanding CO2- App (16)

Or

- (b) Select a suitable angle section to carry a factored tensile force of 290 KN assuming a single row of M2 bolts and assuming design strength as $f_y=250 \text{ N/mm}^2$. CO2- App (16)

13. (a) Design a single angle discontinuous strut of a roof truss carrying factored compressive load 150 kN. The centre to centre distance of intersection is 1.9 m. CO3- App (16)

Or

- (b) Calculate the compressive resistance of a 150 X 150 X 16 angle assuming that the angle is loaded through only one leg, when CO3- App (16)
- a) It is connected by two bolts at the ends
- b) It is connected by one bolt at the ends
- c) It is welded at each end.

Assume that the member has a length of 3m and $f_y = 250 \text{ MPa}$.

14. (a) Design a simply supported beam of span 6m to carry a UDL of 30 KN/m over the entire length. CO4- Ana (16)

Or

- (b) Design a built up column to carry 120 KN load the effective length of the column is 6m. The column shall consists of two channels back to back. Design single lacing system. CO4- Ana (16)
15. (a) Explain in detail how to calculate dead load, live load and wind load for a roof truss. Explain the design procedure of purlins. CO5- App (16)
- Or
- (b) Write the step by step procedure for the design of a gantry girder. CO5- U (16)

