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Question Paper Code: 56103

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

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: 1.15 hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

- _____ connections develop the full moment capacity of connecting members and retain the original angle between the members under any joint rotation. CO1-R
(a) Simple (b) Rigid (c) Semi rigid (d) Rivetted
- A piece of round Steel forged in place to connect two or more Steel members is known as CO1- R
(a) Bolt (b) Revit (c) Screw (d) Stud
- Tension members in form of _____ steel rods are often used to strengthen existing structures by attaching them to the bottom flange or the chord of the structure. CO2-R
(a) high strength (b) low strength (c) medium strength (d) very low strength
- Which is tension number CO2- R
(a) Strut (b) Boom (c) Tie (d) Rafter
- The vertical compression members are called as _____. CO3-R
(a) Boom (b) Rafter (c) Struts (d) Posts

6. When compression members are overloaded, then their failure takes place because of CO3- R
- (a) Direct compression (b) Excessive bending
 (c) Bending combined with twisting (d) Any of these
7. The second order moments in beam columns may be due to _____. CO4-R
- (a) Joint effects (b) Connection effects (c) Load effects (d) Member effects
8. Any major beam in a structure is known as CO4- R
- (a) Subsidiary beam (b) Joist (c) Girder (d) Secondary beams
9. _____ is defined as the space between two adjacent bents. CO5-R
- (a) Effective length (b) Bay (c) Bent (d) Purlin
10. In a plate girder, the vertical stiffeners are provided when the ratio of clear depth to the thickness of web exceeds CO5- R
- (a) 50 (b) 65 (c) 75 (d) 85

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. 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 weld, if CO1-App (8)
- (i) a lap joint is used
 (ii) double cover butt joint is used
12. A single unequal angle 100 x 75 x 6 mm is connected to a 10 mm thick gusset plate at the ends with six 16 mm diameter Bolts to transfer tension. Determine the design tensile strength of the angle assuming that the yield and the ultimate stress of Steel used are 250 MPa 410 MPa. CO2-App (8)
- (i) if the gusset is connected to the 100 mm leg.
 (ii) if the gusset is connected to the 75 mm leg.
13. Determine the design axial load on the column section ISMB 350, given that the height of the column is 3 m and that it is pin ended. Also assume the following: $F_y=250\text{N/mm}^2$; $F_u=410\text{ N/mm}^2$; $E=2 \times 10^5\text{ N/mm}^2$ CO3-App (8)
14. Design a simply supported beam of span 4m carrying a reinforced concrete floor capable of providing lateral restraint to the top CO4-App (8)

compression flange. The UDL is made up of 20 KN/m imposed load and 20 KN/m dead load (section is stiff against bearing). Assume Fe 410 grade steel.

15. Design a purlin of a roof truss for an industrial building located at Chennai with a span of 20m and a length of 50m. The roofing is galvanized iron sheeting. Basic wind speed is 50m/s and the terrain is an open industrial area. Building is class B building with a clear height of 8m at the eaves. CO5- E (8)