KUMARAGURU
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B.E DEGREE EXAMINATIONS: APRIL/MAY 2024

(Regulation 2018)

Sixth Semester

CIVIL ENGINEERING

U18CET6004: Design of Steel Structures

Use of IS 800 – 2007, SP 6(1) – 1964, IS 875 (1–5) - 1987 and other relevant steel tables are permitted

COURSE OUTCOMES

CO1: Design the bolted and welded joints for steel structures.

CO2: Design steel tension members using plates and angle sections.

CO3: Design steel compression members like simple columns, built up columns and angle struts and column bases.

CO4: Design flexural members like beams and plate girders.

CO5: Evaluate the various loads acting and design the truss band design the truss members and purlins.

Time: Three Hours   **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	What are the modes of failure in bolted jaw?	CO1	[K1]
2.	What are the various types of bolts used for structural purposes?	CO1	[K1]
3.	Distinguish between gross area and net area.	CO2	[K2]
4.	Define slenderness ratio.	CO2	[K2]
5.	What is meant by effective length of a column?	CO3	[K1]
6.	Draw the diagram of buckling of column	CO3	[K2]
7.	What is meant by web buckling?	CO4	[K2]
8.	Draw the neat sketch of a plate girder.	CO4	[K1]
9.	List any four types of steel trusses	CO5	[K2]
10.	What are the loads to be considered for the design of gantry girder?	CO5	[K1]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	A 20mm thick steel plate is being connected to another plate of 16mm thickness. The width of the plates are 180mm. The Axial load acting on the plate is 250kN (Tensile). Design the Lap joint with bolts of M20 grade 4.6.	16	CO1	[K3]

| 12. | | Describe the following. | 16 | CO1 | [K$_2$] |

a) Design philosophies and various limit states to be considered in design of steel structures

b) Factor of safety for loads and materials

c) Sectional classification and properties of structural steel

| 13. | | Design a tension member with angle section to carry an axial tension of 300kN. | 16 | CO2 | [K$_3$] |

| 14. | (a) | Design a single angle strut connected to the gusset plate to carry 180 kN factored load. The length of the strut between centre-to-centre intersections is 3 m. | 10 | CO4 | [K$_3$] |
| | (b) | Write the step-by-step design procedure for the design of laced column with neat sketches. | 6 | CO4 | [K$_2$] |

| 15. | | Design a steel beam of span length 5m carrying a factored load of 40 kN/m over the entire span length. The compression flange is laterally supported. | 16 | CO4 | [K$_3$] |

| 16. | (a) | Classify the different types of roof truss with neat sketches | 8 | CO5 | [K$_2$] |
| | (b) | Write down the step-by-step procedure of design of Purlins. | 8 | CO5 | [K$_2$] |

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