KUMARAGURU
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B.E DEGREE EXAMINATIONS: NOV/DEC 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.	Classify the types of bolts used for structural purposes?	CO1	[K$_1$]
2.	Differentiate nominal diameter and gross diameter of bolt.	CO1	[K$_2$]
3.	Define tension member	CO2	[K$_1$]
4.	Write the modes of failure in Tension member.	CO2	[K$_1$]
5.	Define effective length of a column.	CO3	[K$_1$]
6.	What are the uses of providing column base?	CO3	[K$_2$]
7.	Distinguish web buckling and web crippling	CO4	[K$_2$]
8.	Write the elements of the plate girder.	CO4	[K$_1$]
9.	What is the purpose of the purlin in a roof truss?	CO5	[K$_2$]
10.	Give general guidelines for fixing spacing of roof trusses	CO5	[K$_1$]

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

11.	Describe the following:	16	CO1	[K$_2$]
	a) Properties and types of loads considering in steel structures **(2+2)**			
	b) Factor of safety for loads and materials **(2+2)**			

c) Design philosophies and various limit states to be considered in design of steel structures **(4+4)**

12.	A bracket is bolted to the flange of a column as shown in Figure.1.Use 8 mm thick bracket plate and M_{20} bolts of grade 4.6 . Design the connection.	16	CO1	[K_3]

Figure.1

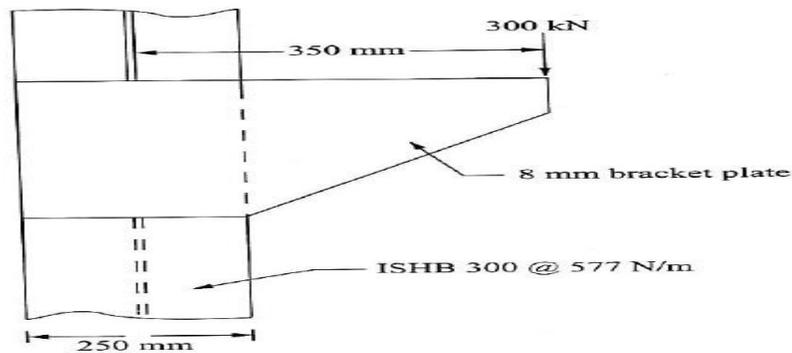|				
13.	Design a single angle section for a tension member of a roof truss to carry a factored tensile force of 225 kN.the member is subjected to the possible reversal of stress due to the action of wind. The length of the member is 3 m. Use 20 mm shop bolts of grade 4.6 for the connection.	16	CO2	[K_3]

14.	(a)	Write the step-by-step design procedure for the design of laced columns with neat sketches.	6	CO4	[K_2]
	(b)	A column 4.0 m long has to support a factored load of 6000 kN.The column is effectively held at both and restrained in direction at one of the ends. Design the column using beam section and plates.	10	CO4	[K_3]

15.	Design a welded plate girder of span 30 m to carry on superimposed load of 35 kN/m. avoid use of bearing and intermediate stiffeners. Use Fe 415 steel	16	CO4	[K_3]

16.	(a)	Draw a neat sketch of various types of roof trusses (minimum 5 types)	8	CO5	[K_2]
	(b)	Write down the step-by-step procedure of design of Purlins.	8	CO5	[K_2]

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