Register Number:……..

KUMARAGURU
college of technology
character is life

B.E/B.TECH DEGREE EXAMINATIONS: APR/MAY 2023

(Regulation 2018)

Sixth Semester

CIVIL ENGINEERING

U18CET6004: DESIGN OF STEEL STRUCTURES

(Use of IS 800-2007 and 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.	List out the uses of bolted connection.	CO1	[K1]
2.	Give the effective throat thickness of a filled weld.	CO1	[K_1]
3.	Explain the concept of tension splices.	CO2	[K_2]
4.	Define lug angle.	CO2	[K_1]
5.	Draw the sketches of compression member with built-up sections.	CO3	[K_1]
6.	Write any two codal provisions to be followed in the design of lacing system as per IS 800 – 2007.	CO3	[K_2]
7.	Distinguish between laterally restrained and unrestrained beams.	CO4	[K_2]
8.	Write the formula for calculating the thickness of beam bearing plate.	CO4	[K_1]
9.	Which section is best suited for a purlin? Justify.	CO5	[K_2]
10.	How much live load on the truss is considered in the design if the angle of slope of roof is 25^0?	CO5	[K_2]

	Answer any FIVE Questions:- **PART B (5 x 16 = 80 Marks)** **(Answer not more than 400 words)**			
11.	Two mild steel plates of 200mm x 16mm size are connected by a single U-butt weld. Determine the strength and efficiency of the joint if the permissible design tensile stress in the plate and weld is 240MPa. Also determine the above values when a double U-butt weld is used.	16	CO1	[K_3]
12.	Design a double angle tension member to carry an axial tension of 480kN, using steel of yield stress 250 N/mm^2 and ultimate stress 410 N/mm^2. The effective length of the member is 6m. The angles are to be connected on either side of 12mm thick gusset plate by fillet welds and provided with necessary tack welds and solid distance pieces throughout the length of member.	16	CO2	[K_3]
13.	A steel column is of 5m height with both of its ends restrained against translation and rotation. It is built-up of an ISHB 400@ 822N/m with two cover plates of 400mm x 10mm size one on each flange connected by fillet welds along the length on to the edges of flanges. The yield stress of steel used is 340 MPa. Determine the design strength of the column.	16	CO3	[K_3]
14.	A conference hall 8m x 12m is provided with a 120mm RCC slab over rolled steel I-beam spaced 4m centre to centre. The super imposed load is 4kN/m^2 and floor finish of 1.5 kN/m^2. Design one of the beam as laterally supported.	16	CO4	[K_3]
15.	Design a i-section purlin for a steel roof truss for the following data Span of roof = 9m Spacing of purlins along slope or truss = 2m Spacing of truss = 3m Slope of roof truss = 1 vertical to 2 horizontal Wind load normal to roof on the roof surface = 1.5 kN/m^2 Vertical load from roof sheet = 0.2 kN/m^2. Sketch the details of the roof.	16	CO5	[K_3]

Please indicate knowledge level (K_1toK_6) and Course Outcome level (CO1 to CO5) against each question for each subdivision.

16.	A double pitched roof truss span 18m is supported columns of 6m height with truss spacing of 6m. The roof cladding is of metal sheets. The central and end heights of the truss are 1.8m and 0.4m respectively. The wind intensity is 47m/s and the building is located in thinly populated zone. Design the roof truss with maximum purlin spacing of 1.8m c/c. Maximum distance between supports for metal roof cladding sheets weighing $50N/m^2$ is 1.55m. External wind load can be taken as 0.8p, where p is design pressure.	16	CO5	[K_3]

****

Please indicate knowledge level (K_1toK_6) and Course Outcome level (CO1 to CO5) against each question for each subdivision.