Code No. : 16115

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (Civil Engg. : CBCS) VI-Semester Main Examinations, January-2021
Design of Steel Structures

Time: **2** hours   Max. Marks: **60**

Note: Answer any NINE questions from Part-A and any THREE from Part-B

Use of IS 800 – 2007 & Steel Tables is permitted

Part-A (9× 2 = 18 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	List any 3 types of Structural Steel?	2	1	1	1
2.	Differentiate between working stress method and limit state method?	2	2	1	1
3.	List three types of tension members with sketches?	2	1	2	1
4.	What is a lug angle?	2	1	2	1
5.	Define effective length and slenderness ratio of columns?	2	1	3	1
6.	What are the various types of lateral systems available for compression members?	2	2	3	1
7.	Define web buckling and web crippling?	2	2	4	1
8.	Why should plastic or compact section be preferred for flexural members in limit state design method?	2	2	4	1
9.	Draw any 2 commonly used trusses and name the same?	2	1	5	1
10.	What are the various loads considered in the design of roof trusses?	2	1	5	1
11.	Expand and explain the term ISHB300@63.0Kg/m?	2	2	1	1
12.	Classify the section ISLB300 @ 37.7 Kg/m as per limit state design	2	3	2	1

Part-B (3 × 14 = 42 Marks)

		M	L	CO	PO
13. a)	List out the different types of welds and welded joints with the help of a neat sketch?	7	2	1	1
b)	Design a double cover butt joint to connect two plates 175mmx10mm of Fe 410 grade using M20 bolts of 4.6 grade. To transfer a load of 400kN. Arrange the bolts in diamond pattern	7	3	1	1
14. a)	Explain about block shear with sketch?Under what circumstances will block shear failure dominate?	7	3	2	1
b)	A tension member ISA 100x75x8mm is connected to a 10mm thick gusset plate the longer leg is connected to the plate with 4 no's of M20 bolts of 4.6 grade. Find the load the member can carry?	7	3	2	1

			M	L	CO	PO
15.	a)	Sketch a typical gusseted base for columns, and mark their parts?	2	2	3	1
	b)	Design a built up laced column with two channels placed back to back to support an axial load of 900kN. The column is 10m long; both ends are held in position and restrained against rotation. Assume Fe 410 grade steel and bolts of grade 4.6	12	3	3	1
16.	a)	What is plastic modulus? Find the plastic modulus of a rectangular section of width b and depth d	2	4	4	1
	b)	Design a laterally supported and simply supported beam of effective span 6m to carry a total uniformly distributed load of 35KN/m. Apply usual checks.	12	3	4	1
17.	a)	Calculate the LL on a roof truss of span 20m and pitch ¼.	2	3	5	1
	b)	The trusses for a factory building are spaced at 3.5 m c/c and the purlins are spaced at 10 m c/c. The pitch of the truss is 1/3 and the span of the roof is 15m. The vertical load from the roof sheets is $250N/m^2$ and the wind load normal to the roof is $1400N/m^2$. Design a I- section purlin.	12	3	5	1
18.	a)	What are the failure modes in bolted joints? Explain any two of them with a neat sketch?	7	2	1	1
	b)	A tie member in a roof truss carries an axial load of 200 KN. It is 2m long. Assuming the connection is through fillet weld, design the connection using an unequal angle?	7	3	2	1
19.		Answer any *two* of the following:				
	a)	Design a suitable slab base for a column section ISHB200@365.9 N/M supporting an axial load of 400 KN. The base plate is to rest on a concrete pedestal of M20 grade?	7	3	3	1
	b)	What is the codal provision to prevent web crippling and web buckling?	7	2	4	1
	c)	What are secondary stresses in roof trusses?The basic wind speed at a site is 47m/s and if factors k1=1, k2=1 and k3=1.054 find the design wind pressure?	7	2	5	1

M: Marks;   L: Bloom's Taxonomy Level;   CO: Course Outcome;   PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	60
2	Knowledge on application and analysis (Level-3 & 4)	40
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	-

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