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Code No. : 16137

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD*Accredited by NAAC with A++ Grade***B.E. (Civil Engg.) VI-Semester Main & Backlog Examinations, June-2022****Design of Steel Structures**

Time: 3 hours

Max. Marks: 60

*Note: i) Answer all questions from Part-A and any FIVE from Part-B**ii) Use of IS-800 and steel Tables is permitted***Part-A (10 × 2 = 20 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	Write the correction factors to be applied for the shear strength of a bolt for long joint connections and large grip length connections.	2	1	1	1
2.	What is throat thickness in a fillet weld and write the minimum and maximum sizes of fillet weld.	2	1	1	1
3.	Where are tension members used in engineering structures?	2	2	2	1
4.	Write the purpose of lug angle.	2	2	2	1
5.	Write the specifications for the width and thickness of lacing flats.	2	1	3	1
6.	List the lateral connecting systems for built up columns.	2	1	3	1
7.	What is shape factor and write its value for rectangular cross sections.	2	1	4	1
8.	Explain the phenomenon of lateral torsional buckling.	2	1	4	1
9.	List the loads acting on roof trusses	2	2	5	1
10.	Write the formula to find the LL on roof trusses.	2	2	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	List the types of failure of bolted joints	2	1	1	1,2
b)	A tension member consisting of an ISA 80 × 50 × 8 mm is welded to a 12 mm thick gusset plate at site. Design welds to transmit a factored load of 225 kN.	6	2	1	1,2
12. a)	Write the expression for net sectional area of a tension member connection with staggered bolting.	2	2	2	1,2
b)	Design a single angle tension member to carry a factored load of 200 kN connected to a gusset plate 16 mm thick with one line of 16 mm dia bolts of grade 4.6.	6	3	2	1,2

Contd... 2

13. a)	A built up column consists of two ISMC 300 placed back to back at a centre to centre spacing of 160mm and its effective length is 4m. The column carries a factored load of 1600 kN. Design the lacing system for the column.	4	3	3	1,2
b)	A column ISMB 350 carries a factored load of 1000 kN. Design the slab base, resting on concrete pedestal of M20 grade.	4	3	3	1,2
14.	Design a beam for an effective span of 5m, to carry a factored superimposed load of 60 kN/m. The compression flange is laterally supported. Check for web crippling and web buckling also.	8	3	4	1,2
15. a)	Design an I purlin for a truss with a roof angle of 25° . The spacing of trusses is 5m. The panel length along the horizontal plane is 1.5m. The design wind pressure is 1.3 kN/m^2 .	5	3	5	1,2
b)	Write the steps to find design wind pressure as per IS 875 –Part 3	3	2	5	1,2
16. a)	Find the strength (bolt value) of a 20 mm diameter bolt of grade 4.6 connecting main plates of 12 mm thick in LAP joint.	4	2	1	1,2
b)	Write the factors that affect the strength of tension members.	4	2	2	1,2
17.	Answer any <i>two</i> of the following:				
a)	Draw a neat sketch of a gusseted base showing plan, front elevation and side elevation.	4	2	3	1,2
b)	Find the plastic moment capacity of a I section with a flange of $100\text{mm} \times 10\text{mm}$ and a web of $10\text{mm} \times 100\text{mm}$.	4	2	4	1,2
c)	Why bracing of roof trusses is necessary.	4	2	5	1,2

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

i)	Blooms Taxonomy Level – 1	22.50%
ii)	Blooms Taxonomy Level – 2	38.75%
iii)	Blooms Taxonomy Level – 3 & 4	38.75%
