



**M.E DEGREE EXAMINATIONS: JUNE 2015**

(Regulation 2014)

Second Semester

**STRUCTURAL ENGINEERING**

P14SET203: Advanced Steel Structures

(IS 800, 801, 1893, 875, 811, 4091, steel tables are permitted)

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Match the normal spacing of column with List 1 and List 2 [K<sub>2</sub>]

List 1

List 2

- |                               |               |
|-------------------------------|---------------|
| A. Industrial shed and Godown | 1. 1.6 to 8 m |
| B. Small Industrial Building  | 2. 5 to 6 m   |
| C. Large Industries           | 3. 6 to 15 m  |
| D. Height of the column       | 4. 7 to 12 m  |

	A	B	C	D
a)	2	1	4	3
b)	3	2	1	4
c)	1	3	4	2
d)	1	2	3	4

2. The beam to column connections expected to resist and transfer end reactions only are [K<sub>2</sub>]  
termed as \_\_\_\_\_.

- |                      |                          |
|----------------------|--------------------------|
| a) Moment connection | b) Shear Connection      |
| c) Rigid connection  | d) Semi rigid connection |

3. Angle provided at the upper flange of the beam is called \_\_\_\_\_. [K<sub>2</sub>]

- |                        |                     |
|------------------------|---------------------|
| a) cleat or clip angle | b) Seat angle       |
| c) Stiffening plate    | d) Stiffening angle |

4. Indian standard code of practice for cold form steel sections [K<sub>2</sub>]

- |                |                 |
|----------------|-----------------|
| a) IS456-2000  | b) IS802-1995   |
| c) IS 800-2007 | d) IS-801- 1975 |



17. List out the applications of towers. [K<sub>2</sub>]
18. Write a note on loads on towers [K<sub>2</sub>]
19. Discuss about Guyed steel chimney. [K<sub>2</sub>]
20. Compare Bunkers and Silos. [K<sub>2</sub>]

**PART C (6 x 5 = 30 Marks)**

21. Construct a typical single storey gable frame and list the various components of it. [K<sub>2</sub>]
22. Design purlin with channel section for a roof truss of 16 m span and 3.2 m rise are spaced 4 m apart in a medium wind zone of 47 m/s basic wind speed. [K<sub>3</sub>]
23. A bracket plate 10mm thick is used to transmit a reaction of 140 kN at an eccentricity of 100mm from the column flange as shown in fig (1). Design the fillet weld. [K<sub>3</sub>]

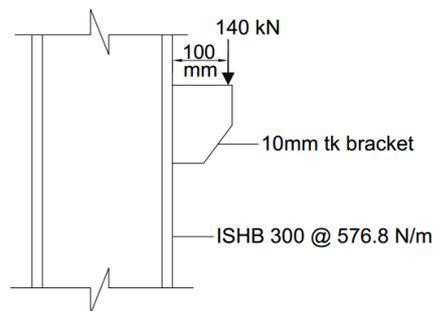


Fig (1)

24. If the rectangular box section shown in fig (2) is to be used as a column. Evaluate the design width for the element for the purpose of load determination yield stress of the material is 24kg/mm<sup>2</sup>. [K<sub>3</sub>]

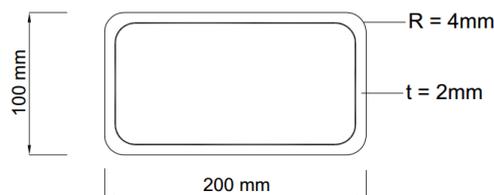


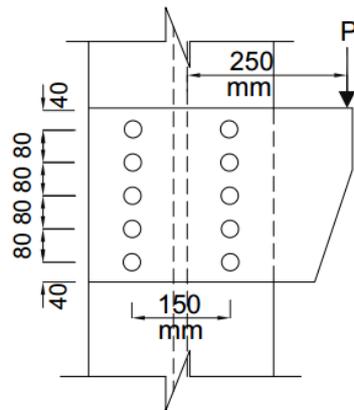
Fig (2)

25. Write a detailed note about the classification of towers. [K<sub>2</sub>]
26. Discuss in detail about the forces acting on steel chimney. [K<sub>2</sub>]

**PART D (4 x 10 = 40 Marks)**

27. Design the gable rafter, side rails, gable column and gable wind girder for the industrial building with the following data. The span of knee roof trusses used over the industrial building 30m long is 18m, the spacing of roof trusses is 5m. The pitch of the roof truss is 1/4. The galvanized corrugated iron sheets are used for roof covering. The basic wind pressure is 1.25kN/m<sup>2</sup> and there is no snow fall. The height of the eaves above ground level is 8m. Propose a suitable type of roof truss. [K<sub>4</sub>]

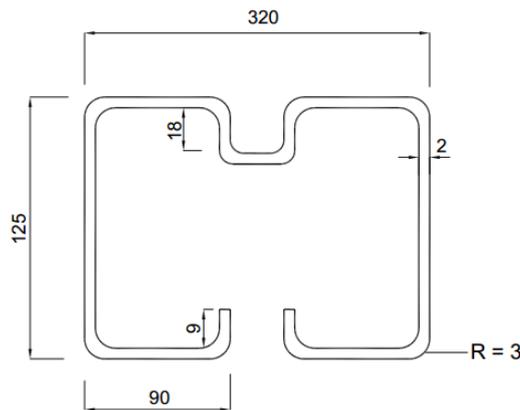
28. Determine the safe load P that can be carried by the joint shown in fig (3). The bolts used [K<sub>4</sub>] are 20 mm diameter of grade 4.6. The thickness of the flange of I-section is 9.1 mm and that of bracket plate 10mm.



(All dimensions are in mm)

**Fig (3)**

29. Evaluate the effective area including intermediate stiffness of the multiple stiffened [K<sub>4</sub>] compression flange of the beam shown in fig (4) for load determination. Given that the member is made up of St 34-1079.



(All dimensions are in mm)

**Fig (4)**

30. A steel tower is to be erected for transmission for a single circuit three-phase, 50 cycles [K<sub>5</sub>] per second to transmit 50 MW at 0.75 power factor for 259 km as per the following design data.

Voltage of transmission = 132 kV

Unit weight of conductor = 16.76 N/m

Permissible axial tension = 35.60 kN

Young's modulus of elasticity =  $0.842 \times 10^5$  N/mm<sup>2</sup>

Coefficient of expansion = 0.00001992 / °C

Shape factor for conductor = 0.67

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