

8. Design a suitable base and anchor bolts for column subjected to an axial load of 710 KN and a wind moment at 250 KNm. The column section ISMB 450@907 N/m. The safe bearing pressure at concrete may be assumed to be 6000 KN/m<sup>2</sup>.

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Roll No. ....

**23393**

**M. Tech. 1st Semester (Civil Engg.)  
(Specialisation in Structural Design)  
Examination – January, 2023**

**DESIGN OF STRUCTURES-I**

Paper : MTSD-104

Time : Three Hours ]

[ Maximum Marks : 100

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt five questions in all. Assume any data if missing.

1. (a) Explain the differences between welded & bolted connections. Which type of connections are preferred at site and why? 10
- (b) Explain & draw stress-strain curve of mild steel in detail and also explain the design specification as per IS 800:2007. 10

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2. (a) Design a column of effective length 8 m. It is subjected to an axial load of 2000 KN provide two channels back to back connected with battens by welded connection. Assume  $F_y = 250$  MPa. 10
- (b) Design a beam of 7.5 m effective span carrying a uniform load of 45 KN/m if the compression flange is laterally unsupported. Assuming  $F_y = 250$  N/mm<sup>2</sup>. 10
3. (a) Design a pin to connect two pair of parallel eye bars of size 300 × 60 mm. The space between the inner pairs is 80 mm apart. Take  $F_y = 250$  N/mm<sup>2</sup>. 10
- (b) Design a double bolted lap joint for a plate of 30 mm thickness to carry its full load. 10
4. Design an I-section purlin for the following data : 20
- Spacing of roof truss = 6 m
- Spacing of purlins = 3 m
- Pitch of roof = 1/6
- Weight of GI sheeting = 138 N/m<sup>2</sup>
- Wind Load intensity normal to roof = 1.6 KN/m<sup>2</sup>.

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5. Design a short circular column in moderate environment subjected to an axial load of 2000 KN and bending moment of 350 KNm. Adopt M25 concrete and Fe415 grade steel. 20
6. (a) Using a lug angle, design a suitable riveted end connection for an angle weld is to be 10 mm, find the length of the side fillet weld. 10
- (b) What are the different types of weld ? Explain with neat sketch. 10
7. (a) Design a rectangular isolated footing of uniform thickness for R.C. column bearing a vertical load of 2000 KN and having a base size of 600 × 800 mm. The safe bearing capacity of the soil may be taken as 200 KN/m<sup>2</sup>. Use M25 concrete and Fe500 steel. 10
- (b) Explain all the types of footings with neat and clear sketch and also write down IS code recommendations for design of footing. 10

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