

B.TECH CIVIL ENGINEERING (BTCLEVI)**Term-End Examination****December, 2012****BICE-013: STRUCTURAL DESIGN AND
DRAWING - I***Time : 3 hours**Maximum Marks : 70*

*Note : Answer **any seven** questions. IS 456 and IS 800 codes are allowed. Use of calculator is permitted.*

1. Design a single reinforced rectangular beam (Find the reinforcement) for an applied factored moment of 120 kN/m. Assume the width of section as 230 mm. The materials are M_{20} grade concrete and HYSD reinforcement of grade Fe_{415} . 10
2. Design a one way slab, with a clear span of 4.0 m, simply supported on 230 mm thick masonry walls and subjected to live load of 4 kN/m². Assume Fe_{415} steel. Assume that the slab is subjected to moderate exposure condition. 10
3. Design the reinforcement in a spiral column of 400 mm diameter subjected to a factored load of 1500 kN. The column has an unsupported length of 3.4 m and is braced against sideway. Use M_{25} concrete and Fe_{415} steel. 10

4. Explain different types of footing with sketch. 10
What are the design considerations and code requirements for isolated footing and combined footing.
5. Write the different structural components of a counterfort retaining wall. Show with suitable sketch the reinforcement detailing of a counterfort retaining wall. 10
6. Determine the maximum load in the rivets of the eccentric connections shown in fig-1. 10

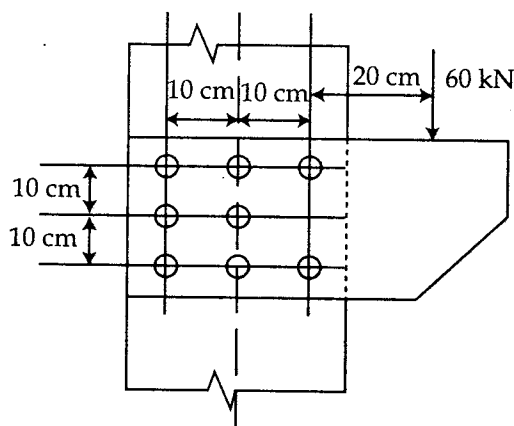


Fig. 1

7. Design a tension member using channel section to carry an axial tension of 220 kN. 10

8. A column of section ISHB @ 54.7 kg/m, carrying an axial load of 700 kN is supported over another column of section ISHB 350 @ 72.4 kg/m. Design the splicing at the function. Take $f_3 = 250 \text{ N/mm}^2$. The ends are milled for full bearing. 10
9. Design an I-section purlin for a trussed roof from the following data. 10
- Span of roof = 12 m
Spacing of truss = 5 m
Spacing of purlins along slope of roof truss = 2 m
Slope of roof truss = 1 vertical, 2 horizontal
Wind load on roof surface normal to roof = 1000 N/m^2
Vertical load from roof sheets = 200 N/m^2
10. Write short notes on *any two* : 10
- (a) Design of web of a plate girder
 - (b) Gusseted base foundation
 - (c) Roof trusses
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