Code :R5320103 **R5**

III B.Tech II Semester(R05) Supplementary Examinations, April/May 2011
BASIC STRUCTURAL STEEL DESIGN & DRAWING
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE questions
All questions carry equal marks
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1. A column section ISHB300 at 63 kg/m with one cover plate 400 mm × 20 mm on either side is carrying an axial load of 2000 kN inclusive of self weight of base and column. Design a gusseted base for the column, assuming the allowable bearing pressure on concrete as 4 N/mm^2 and the bending stress in base plate as 185 N/mm^2. Sketch the details of the gusseted base.
   (a) Side view of the gusseted base
   (b) Plan view of the foundation.
2. A built-up steel column comprising two ISWB 400 Rolled Steel Joint sections with their webs spaced at 350 mm and connected by 10 mm thick battens, transmits an axial load of 2050 kN. Safe bearing capacity of soil at site = 300 KN/m^2. The safe permissible stress on the concrete bed = 4 N/mm^2. Design a suitable foundation for the column adopting a slab base, and sketch the details of the foundation.
3. Design a welded plate girder of 30 m span to the support a live load of 75 kN/m uniformly distributed over the span. Adopt permissible stress as per I.S.:800-1984. Draw the longitudinal elevation, cross-section and plane of the girder.
4. An ISA 90×90×12 angle is subjected to a compression of 210 kN. Design a fillet weld connecting it to 12mm thick gusset plate and show the details.
5. A simply supported beam of effective span 12m carries a uniformly distributed load of 40 kN/m. Taking F$_y$ 250N/mm^2 and E=2×10^5 N/mm^2 design the beam if it is laterally supported. Draw the details of beam.
6. (a) Explain about splicing of columns?
   (b) A double channel column section; channels placed back to back carries an axial load of 14000 kN. The effective length of the column is 3m. Design the section take F$_y$ = 200 N/mm^2.
7. Design an I section purlin with and without sag bars for a trussed roof from the following data :
   Span of roof = 12 m.
   Spacing of purlins along slope of truss = 1.8 m
   Spacing of truss = 4 m
   Slope of truss = 1 vertical, 2 horizontal
   Wind load on roof surface normal to roof = 1200 N/m^2
   Vertical load from roof sheets = 200 N/m^2.
8. A plate girder is composed of the following elements :
   (a) Web plate : 900 mm depth × 10 mm thickness
   (b) Two angles : ISA 200 mm × 100 mm × 12.0 mm @ 27.2 kg/m, in each flange
   (c) Two flange plates : 500 mm × 16 mm in each flange. The girder is simply supported over an effective span of 12 m. The diameter of riverts used for connecting flange angles to the web and flange plates to flange angles is 20 mm.
   (d) Determine the safe uniformly distributed load which the girder can carry, inclusive of its own weight. Assume that the compression flange is not restrained against lateral bending, but the ends are restrained against torsion. Take f$_y$= 250 N/mm^2.

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