

B.E. Civil Engineering (Model Curriculum) Semester-VI
PCC-CE605 - Design of Steel Structure

P. Pages : 2

Time : Four Hours



GUG/W/23/13736

Max. Marks : 80

- Notes :
1. All questions carry equal marks.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Diagrams and Chemical equation should be given wherever necessary.
 5. Illustrate your answers wherever necessary with the help of neat sketches.
 6. I. S. I. Handbook for structural steel section, I.S. Code 800/2007, I. S. 456 (Revised), I. S. 875 may be consulted.

1. Design a tension member consisting of 2 ISA (tacked) on same side of 15 mm thick gusset Plate with longer leg outstanding to carry axial load of 225KN using 20 mm dia Bolt. $F_y = 250\text{MPa}$. Sketch the structure details. C/C length of member is 4.0m. **13**

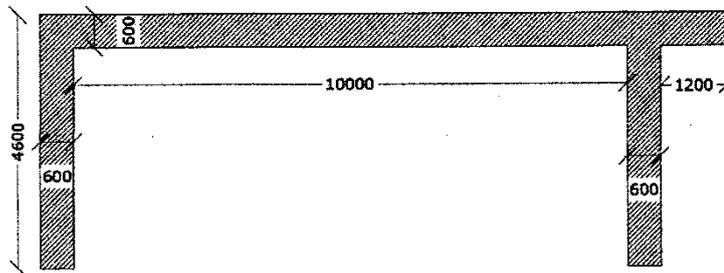
OR

2. Design a double angle discontinuous strut to carry 20kN load. The length of strut between Center to center of intersection is 3.2m. Design the connection of angles with the gusset plate by welding. Use IS 800-2007. **13**

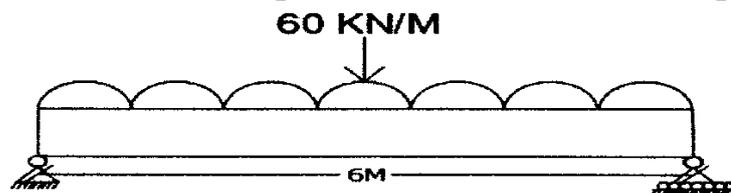
3. Two plates 200mm x 12mm and 100mm x 10mm are lap-joined to carry axial force of 100kN by using 20mm dia. bolt $f_y = 250\text{MPa}$. Design the connection, find the efficiency of the joint. Sketch the structural details, IS 800-2007. **13**

OR

4. Find shape factor for the following cross-section. **13**

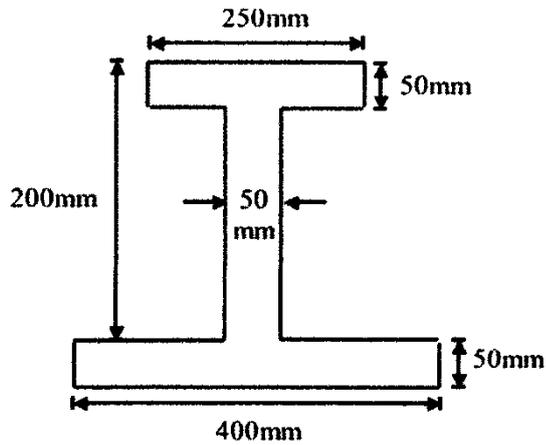


5. Find collapse load factor for following beam. Select the section for design. **14**



OR

6. Find shape factor for the following cross-section. 14



7. A welded plate girder of span 25m is laterally restrained through-out its length. It has to carry a load of 80kN/m over the whole span besides its weight. Design the girder with intermediate stiffeners. 20

OR

8. Design a battened column to carry axial load of 800 kN and shear force of 80 kN consisting of two channels back to back. $F_y = 250$ MPa. $L_x = 4.5$ m, $L_y = 6.0$ m. column ends are effectively held in position and restrained against rotation about both axes. Use load factor 1.5. Sketch structural details. 20

8. A beam ISMB 400 @ 616 N/m transfer 100 kN end reaction and 50 kNm end moment to the flange of ISHB 350 @ 674 N/m. Design suitable beam-column connection using 22 mm. $F_y = 250$ MPa, Load Factor = 1.5. Sketch structural details. 20

OR

10. Design a slab base to column ISHB 400 @ 822 N/m carrying axial load of 1000 kN and B. M of 30 kNm about major axis. Concrete block is of M20 grade concrete. SBC of soil is 300 kN/m² $F_y = 250$ MPa. Load factor is 1.5. Sketch structural details. 20
