Roll No. | | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 10

B.Arch. (2012 & Onwards) (Sem.–5)

# STRUCTURE DESIGN – IV

Subject Code : BACH-508

M.Code : 71752

Time : 3 Hrs. Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. Attempt any FIVE questions selecting one from each unit.
2. Missing data, if any may be assumed suitably.
3. Use of Steel Tables and IS 800 is allowed.

## UNIT-I

1. a) Explain the effective length of columns for various end conditions. (4)

   b) Explain classification of compression members as given in IS 800:2007. (6)

2. An ISHB 400 @ 806.4 N/m is to be used as a column. If the column is 4.0 m long with both of its ends fixed, determine the design axial load carrying capacity of the column. Take fy = 250 MPa and fu = 410 MPa. (10)

## UNIT-II

3. Determine the design bending strength of a beam ISMB 350 @ 514N/m if the compression flange is laterally supported throughout. Apply suitable checks. Assume that factored shear force is less than design shear strength. Steel grade Fe 410. (10)

4. A simply supported steel beam of effective span 5.0 m has to support a total load of 60 kN/m excluding its self-weight. Design an I-section (beam). Assume that the beam is restrained against buckling and stiff against bearing. (10)

## UNIT-III

5. Design a tie member of truss for pulling force of 200 kN check it for reversal of stresses under wind loads, compressive force to be included in the member is 60 kN and node to node distance is 2.0 m. (10)

6. Design a strut for a compressive force of 50 kN and tensile form of 70 kN (under reversal of stresses under wind loads). The length of the strut is 2.24 m. (10)

## UNIT-IV

7. Draw a neat sketch of two-tier grillage footing along with its bending moment diagram. Mark the point of maximum bending moment and shear force. Also explain under what circumstances the grillage footing is provided. (10)

8. Design suitable beam sections for upper tier of a two-tier grillage foundation for a column to support an axial load of 1500 kN. The size of the base plate is 750 × 750mm.The safe bearing capacity of soil is 200kN/$m^2$. (10)

## UNIT-V

9. a) Explain various types of failures of rivetted joints with the help of diagrams. (6)

   b) Calculate the efficiency of a double cover double riveted butt joint used to join two plates 200 mm width and 12mm thick with 10 mm thick cover plates. Plates have been joined with 9 rivets of 20 mm dia. in chain riveting at a gauge of 60mm.Take permissible stresses as 100 MPa in shear, 150 MPa in tearing and 300MPa in crushing. (4)

10. a) Explain various types of welded joints with the help of diagrams and discuss their failures. (6)

    b) Write short notes on : (4)

    (*i*) Throat thickness and Size of weld.

    (*ii*) Plug and slot weld



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**