TH-II   STRUCTURAL DESIGN-II

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1 & 2

Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a.   With a neat sketch give examples of bolted connection with single shear plane and double shear plane.

   b.   Differentiate between limit states of strength and limit state of serviceability.

   c.   What do you mean by crinkling in tubes?

   d.   What is slenderness ratio of a masonry wall?

   e.   What will be the buckling class of ISHB 450@ 925 N/m about Z-Z and Y-Y axis?

   f.   What is the minimum and maximum value of pitch of bolts in a tension member?

   g.   Define Bolt value.

   h.   What are the types of mortar?

   i.   What is the recommended throat thickness for incomplete penetration butt weld welded from one side only?

   j.   What do you mean by HSFG bolts?

2.   Answer **Any Six** Questions   5X6

   a.   Write down the advantages of welded connection over bolted connection.

   b.   Design a single angle tension member of a roof truss to carry a factored tensile load of 225 KN. The member is subjected to the possible reversal of stresses due to action of wind. The length of member is 3 metre. Use 20mm shop bolts of grade 4.6 for the connection. Assume any other suitable data.

   c.   Explain about buckling class of cross sections in compression member.

   d.   Write short note on design consideration for masonry wall footing.

   e.   Write short note on web buckling and web crippling.

   f.   A tubular Steel column of 4.8m length is hinged at both ends. It has nominal diameter of 225 mm and confirms to yst 25 grade. Determine the safe load carrying capacity of the column.

g   Write the difference between limit state method and working stress method.

3   Design a steel column section using channel section only to carry factored   10
    axial load of 400 KN. The column is 4 m long and is effectively held in
    position at both ends but restrained against rotation at one end. Consider
    fy=250 MPa. Assume any other suitable data.

4   Determine the load carrying capacity of a brick masonry column at its   10
    base for following data.
    Effective height=3.5 m,
    Column section- 400mm × 400mm
    Grade of motar-m2
    Average compressive strength of bricks=7.5 N/mm2
    Assume modular bricks and racked joints.

5   A laterally supported beam ISMB 600@1202.71 N/m is placed between   10
    two supports. Determine the safe uniformly distributed load the beam
    can carry for an effective span of 8m. Take fy=250 N/mm2. Neglect web
    buckling and web crippling.

6   Find the maximum force that can be transmitted through a double bolted   10
    chain lap joint consisting of 6 balls in two rows. Given that M16 bolts are
    4.6 grade and plates are of Fe410. The thickness of the plates connected
    are 10 mm and 12 mm.

7   Design a welded lap joint for two plates of size 120 mm × 8 mm and 120   10
    mm × 12mm for maximum efficiency. Assume shop welding and Fe410
    grade of Steel.