Seat
No.

T.E. (Civil) (Semester - V) Examination, Nov. - 2013
DESIGN OF STEEL STRUCTURES (New)
Sub. Code : 45536

Day and Date : Wednesday, 27 - 11 - 2013   Total Marks :100

Time : 2.30 p.m. to 5.30 p.m.

Instructions : 1)   Attempt any three questions from section I and any three questions from section II.
          2)   Figures to the right indicate full marks.
          3)   Use of IS : 800 (1984 & 2007), steel table, IS : 875 allowed.
          4)   Use of non programmable calculator is allowed.
          5)   Assume suitable data if required.

SECTION - I

Q1) a)   Explain how wind load is arrived at on roof truss.   **[6]**

     b)   Compare welded connections with rivetted connections.   **[6]**

     c)   Write in short on IS : 800 : 1984 & IS : 875.   **[6]**

Q2) a)   Explain in short the 'Lug angle' & its need and design.   **[6]**

     b)   Design a tension member to carry an axial tensile load of 150 kN. The member is connected to gusset plate by welding. Design the connection and prepare a neat sketch.   **[10]**

Q3) a)   What is an angle strut? Differentiate between continuous and discontinuous angle strut.   **[4]**

     b)   Calculate safe compressive load carrying capacity of double angle discontinuous strut composed by 2 ISA 80 × 50 × 6 with long leg connected back to back on either side of gusset plate 10 mm thick. The length of strut between centre to centre of intersection is 3 meter and tacking done.   **[12]**

Q4) a) Write in short on curtailment of flange in beam. [4]

b) A beam span 6 meters has to support a load of 20 kN/meter (including self weight). Design a suitable section for a beam. The beam is laterally supported throughout. Check for shear and deflection is required. Take $f_y = 250$ MPa. [12]

SECTION - II

Q5) Calculate the design forces for the gantry girder using data given below. [16]

i) Crane capacity — 200 kN
ii) Weight of crane girder — 200kN
iii) Weight of crab — 60kN
iv) Span of crane girder — 15 meter
v) Span of gantry girder — 6 meter
vi) Minimum approach of hook — 1.2 meter
vii) Wheel base — 3.0 meter

Crane is electrically operated.

Q6) a) Draw a typical sketch of slab base and explain the design procedure for the same. [6]

b) A square column 425 mm × 425 mm consists of 4 angles ISA 90× 90 × 10 mm each placed at the corner of square section. The length of column is 6 meters and is hinged at both ends. Determine the safe load it can carry and design a suitable lacing system for connecting the angles. [12]

Q7) a) Explain in short the moment resistant base and design of anchor bolt. [6]

b) Explain in short design procedure to be followed in design of compression member by using IS : 800 : 2007 . [6]

c) Explain the term partial safety factor for materials. [4]

Q8) a) Find out the design strength of angle 100 × 100 × 10 mm in tension connected to gusset plate 10 mm thick through 100 mm leg using M20 bolt of class 4.6 in a single line. The yield and ultimate strength of steel are 25v MPa and 410 MPa respectively. [10]

b) Write on design strength calculation for tension member due to yielding, rupture and block shear. [6]

❈ ❈ ❈