NN-115

December-2015

B.Arch., Sem.-V

AR-503 : Structures

Time : 2 Hours] **[Max. Marks : 50**

Instructions : (1) Figures to right indicate full marks.
(2) Answer must be precise and upto the point.
(3) Design shall be as per IS800 – 2007.

1. A hall with inside clear dimensions of 5m × 20 m having 250 mm thick masonry walls and 4 beams to support 100 mm thick concrete slab. Design a steel beam to support if the live load is 2.5 kN/sqm. Do the necessary checks for Shear and Deflection.
   E = 2 × 10^5 N/sqmm, Grade of Steel Fy 250. Plastic Section modulus = 1.2 × elastic section modulus (Zp = 1.2 Ze) **10**

2. Design a Steel column of length 4m long to carry and axial load of 300 kN and is effectively held in position & restrained against rotation at one end and other end restrained against rotation but not held in position. Consider Fy = 250 N/sqmm (Zp = 1.2 Ze) **7**

3. Design a beam of span 10 m and load of 50 kN/m. Check for Shear and Moment Capacity. **8**

4. (a) Define : ISMB, ISJC, ISA, ISMC **2**
   (b) Write and note on castellated beam with sketch and advantages. **2**
   (c) What are the classification of steel section as per IS800 2007 ? **2**
   (d) Draw a neat sketch of Gantry girder and what are the types of forces acting on it ? **3**
   (e) Explain the different types of failure in steel connections with sketches. **3**

5. Detail neatly different components of plate girder. Also with the advantages and disadvantages of Plate Girder over Truss. **4**

6. Attempt any the following :
   (a) What are the advantages and disadvantages of welded connection ? **3**
   (b) Write a note on effective length of the columns to be considered. **3**
   (c) Mention advantages and disadvantages of steel as a structural member. **3**

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