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T.E. (Civil) (Semester - V) Examination, December - 2014
 DESIGN OF STEEL STRUCTURES (New)

Sub. Code : 45536

Day and Date : Thursday, 04 - 12 - 2014

Total Marks : 100

Time : 2.30 p.m. to 05.30 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 non programable calculator is allowed.
 - 4) Use IS : 800 (1984 & 2007), steel table IS : 875 allowed
 - 5) Assume suitable data if required.

SECTION - I

- Q1) a) A plate bracket carrying a load of 150 K N at an eccentricity of 100 mm, is connected to flange of I section. Determine the size of filled weld. The depth of bracket is 300mm at the member face. The weld is applied on both sides of bracket. [10]
- b) i) What are the advantages of steel structure over other types? [4]
 ii) Enlist the loads acting on the structure and write on live load calculation for roof truss. [4]
- Q2) a) Explain step by step procedure to be followed in design of tension member. [6]
- b) Find the safe tensile load carrying capacity for double angle member ISA 90 × 60 × 6 provided on either side of gusset plate for following cases. [10]
- i) When tacking is provided.
 - ii) When tacking is not provided.

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- Q3) a) Write in short on design steps to be followed in design of Angle strut. [4]
- b) A strut in a truss is 3.5 meter long and is required to carry an axial compressive force of 200 kN. Design the strut and connection. [12]
- Q4) a) A simply supported beam of span 5.0 meter is subjected to a superimposed load of 30 kN per meter over entire span and a concentrated load of 200 kN at mid span. Design the beam and check for deflection and shear. The beam is laterally supported throughout. [12]
- b) Write on design of laterally unsupported beam. [4]

SECTION - II

- Q5) a) Draw a typical sketch of gantry girder section and explain in short procedure to be followed in design of gantry girder. [8]
- b) Calculate absolute maximum Bending moment for the gantry girder with following data. [10]
- Effective span of gantry girder - 5.5 m.
 - Effective span of crane girder - 20.0 m.
 - Crane capacity 100 kN.
 - Minimum approach distance - 0.8 m.
 - Weight of crane girder 210 kN.
 - Weight of trolley 40 kN.
 - Wheel base 3.6 meter.
- Crane is electrically operated.

Q6) a) Design a battened column to carry a load of 1000 kN. The column is 3 meter long with both ends hinged. Design the column only. [8]

b) Design a suitable slab base for a column ISHB 200 supporting an axial load of 400 kN. The permissible bearing pressure on concrete is 4 MPa. Draw a neat sketch. [8]

Q7) a) Explain in short procedure to be followed in design of tension member by using IS : 800 : 2007. [6]

b) The loads on the floor beam of a commercial building are as below. [6]

Root load : Dead load 6 kN/m², Live load 4 kN/m², finishing load 1.5 kN/m².

Determine design load for.

i) Limit state of strength.

ii) Limit state of serviceability.

c) Write on partial safety factor. [4]

Q8) a) Calculate the design compressive load for a stanchion 35 v_p 710.2 N/m 3.5 meter high. The column is restrained in direction and position at both the ends use steel of grade fe 410 with f_y 250 MPa, use IS : 800 : 2007. [8]

b) Explain in short design procedure for compression member by using IS : 800 : 2007. [8]

