(DCE 315)

B. Tech. DEGREE EXAMINATION, MAY - 2015

(Examination at the end of Third Year)

Civil Engineering

Paper - V : DESIGN OF STEEL STRUCTURES - I

Time : 3 Hours **Maximum Marks : 75**

Assume Suitable Data.

Answer ONE question from each unit ***(5 x 15 = 75)***

UNIT - I

1) a) List the advantages and disadvantages of using steel as a structural member. **(5)**

b) A double riveted double cover butt joint is used to connect plates of 12 mm thick using Unwin's formula, determine the diameter of rivet, rivet value, gauge and efficiency of joint. Take $\sigma_{at} = 150$ MPa, $\tau_{vf} = 80$ MPa and $\sigma_{pf} = 250$ MPa **(10)**

OR

2) Design a tension member using a channel section to carry an axial tension of 250 kN. **(15)**

UNIT - II

3) A steel column 12 m long carries an axial load of 1,200 kN. The column is hinged at both its ends. Design an economical built-up section with lacing. Design the lacing also. **(15)**

OR

4) A column section ISBH 400 @ 0.822 kN/m is carrying an axial load of 600 kN and a moment of 22.5 kNm and shear force of 45 kN. Design a column splice. **(15)**

UNIT - III

5) Design a grillage foundation for a column carrying an axial load of 1600 kN inclusive of self weight. The bearing capacity of soil is 180 kN/m^2. The column base plate resting on the grillage is 600 mm × 600 mm. **(15)**

OR

6) A column section ISHB 300 @ 0.63 kN/m with one cover plate 400 mm × 20 mm on either side is carrying an axial load of 3000 kN inclusive of self weight of base and column. Design a gusseted base. The allowable bending pressure in concrete is 4N/mm^2. The allowable bending stress in base plate is 185 N/mm^2. **(15)**

UNIT - IV

7) Design a simply supported beam with an effective span of 6m, carrying a uniform distributed load of 40 kN/m inclusive of self weight over the entire span. The overall depth of the beam is restricted to 350 mm. The compression flange of the beam is laterally supported throughout. Take f_y as 250 N/mm^2. **(15)**

OR

8) Design a beam of 6m effective span, carrying a uniformly distributed load of 20 kN/m. If the compression flange is laterally unsupported. Assume f_y as 250 N/mm^2. **(15)**

UNIT - V

9) Design a bracket connection to support an end reaction of 200 kN. the eccentricity of the load is 250 mm. **(15)**

OR

10) A beam ISMB 450 @ 724 N/m transmits a shear of 250 kN and a moment of 160 kNm to the flange of a steel column ISMB 400 @ 822 N/m. Design a suitable beam-column shop welded connection. **(15)**

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