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**Eighth Semester B.E. Degree Examination, Feb./Mar. 2022**  
**Design and Drawing of Steel Structures**

Time: 4 hrs.

Max. Marks: 100

*Note: 1. Answer any ONE full questions, from PART-A and PART-B.*

*2. Use of IS 800-2007 and SP 6(1)-1984 or steel table is permitted.*

**PART – A**

- 1 a. A beam ISLB 500 @ 75 kg/m is connected to the flange of the column ISHB 400 @ 82.2 kg/m with a pair of stiffener. The stiffener are 2 ISA 80 × 80 × 8 mm. Use 10 bolts of 16 mm dia with 5 bolts in each row with a pitch of 60 mm. A seat angle of ISA 110 × 110 × 15 mm and a top cleat angle of ISA 100 × 100 × 10 mm is provided with nominal bolts of 12 mm dia for connection. Draw to a suitable scale: (i) Front view (ii) Side view. (15 Marks)
- b. Column splice connection is made between column ISHB 400 @ 0.774 kN/m and top column ISHB 350 @ 0.674 kN/m. The thickness of bearing plate is 32 mm. Two filler plate each of 25 mm thick are provided for top column. The thickness of splice plate is 10 mm. 6 number of 20 mm diameter close tolerance bolts are provided in two rows for connecting each of the bottom column flange and splice plate. 8 Numbers of 20 mm dia bolts are provided in two rows for connecting each of top column flange. Assume 70 mm pitch. Draw to a suitable scale. Draw to a suitable scale: (i) Elevation (ii) Side view (15 Marks)
- 2 a. A gusseted base is to be detailed for a column ISHB 450 @ 855 N/m built up with one cover plate of size 300 mm × 12 mm on each flange size of base plate is 0.6m × 1m × 20 mm. The gusset angle are 150 mm × 150 mm × 12 mm. Gusset plates are 10 mm thick provide 16 numbers of bolts in four rows along each face of the column to connect flange of column gusset plate and gusset angle provide nominal bolts to connect sides of gusset plate and gusset angle. Draw to a suitable scale: (i) Sectional Elevation (ii) Side View (15 Marks)
- b. Draw to a suitable scale the plan and elevation of 2-I section of size ISHB 300 @ 63 kg/m by a single lacing system with a spacing of 350 mm c/c between the web lacing bar is of 70 ISF 8 with 5 mm fillet weld for a length of 50 mm on either side of flat at the end. The angle of inclination of the lacing bar is 45° with longitudinal axis of the column. Also provide a tie plate at the bottom of column size 450 mm × 150 mm × 8 mm with 6 mm, find weld length of column 3.5 m. Show 3 lacing bar in elevation. (15 Marks)

**PART – B**

- 3 Design a plate girder for an effective span 14 m imposed load on girder consist of UDL 45 kN/m in addition to two point load each of magnitude 400 kN placed at a distance 3m on either side of midpoint of girder.  
Design: (i) Mid span c/s (ii) Curtailment of flange (iii) Intermediate stiffener  
(iv) End Bearings stiffeners (40 Marks)  
Draw to a suitable scale: (i) Longitudinal section (ii) Plan  
(iii) Cross section (30 Marks)
- 4 Design a gantry girder of span 25 m column spacing 8m wheel base 3.5 m crane capacity 200 kW weight of crane bridge 150 kN weighs of trolley crab 75 kN min hook distance 1m weight of rail 0.3 kN/m. (40 Marks)  
Draw to a suitable scale: (i) Cross section (ii) Longitudinal section (iii) Plan of girder. (30 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.