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10CV82

Eighth Semester B.E. Degree Examination, Dec.2017/Jan.2018

Design and Drawing of Steel Structures

Time: 4 hrs.

Max. Marks:100

Note : 1. Answer any ONE full questions from Part – A and ONE full question from Part - B.

2. Use of IS 800 – 2007 , SP(6) (1) – 1984 or Steel Tables permitted.

PART – A

- 1 a. An un – stiffened seated connection for beam ISLB 500 @ 75kg/m to the flange of a column ISHB400 @ 82.2 kg/m is done using 2 rows of 2 – 16 mm diameter bolts with an angle ISA 110×110×10 mm. Top cleat angle is ISA 100×100×8 mm with 2 – 16 mm diameter bolts on each leg. Draw to a suitable scale i) Front view ii) Side view. (14 Marks)
- b. A cross beam ISLB 350 @ 0.495kN/m is connected to main beam ISMB 500 @ 0.869kN/m, such that top of flanges are at same level. The framed connection has the following details : i) Connecting cleat angle - 2 ISA 150 × 115 × 10.
ii) The connection between cleat angle of length 115mm and web of the cross beam is connected by 5mm fillet weld. Depth of the weld is 180mm.
iii) The connection between the cleat angle of length 150mm and web of the main beam is connected by 8mm fillet weld. Depth of the weld is 250mm.
iv) Clearance between cross beam and web of main beam is 12mm.
Draw to a suitable scale i) Front view ii) Side view. (16 Marks)
- 2 a. Draw to a suitable scale the front and side elevations of a welded bracket from the following data :
* Column → ISHB 350 @ 710.2N/m
* Bracket → ISLB 350 @ 485.6N/m
* Projection of bracket from flange of the column → 350mm
* Depth of bracket at free end → 150mm
* Size of weld → 8mm
* Bracket is welded to the flange of column. (10 Marks)
- b. A column ISHB 450 @ 0.925kN/m is supported by Gusseted base. Dimension of the base plate is 1200 × 800 × 22mm with 1200mm edge placed parallel to column flange. Gusset plate is 16mm thick. Gusset angles are of ISA 150 × 115 × 15 mm two in number with 150mm leg connected to Gusset plate. Connection between column flange and Gusset plate has 18 numbers of 18mm bolts in two rows and same number of bolts for connection between Gusset plate and Gusset angle. Provide 6 numbers of 18mm diameter bolts to connect Gusset angle to base plate. Provide two web cleat angles of ISA 100 × 100 × 8mm connected by 3 numbers of 18mm bolts for each leg. Also, 4 numbers of 25mm anchor bolts are provided. Draw to a suitable scale i) Top view ii) Side view iii) Sectional elevation. (20 Marks)

PART – B

- 3 Draw a simply supported crane Gantry Girder for the following data :
- Span of crane Girder = 18m.
 - Span of Gantry Girder = 7m.
 - Capacity of the crane = 230 kN.
 - Self wt. of crane excluding the crab = 200kN.
 - Weight of crab = 60kN.
 - Wheel base distance = 3.2m.
 - Self weight of Rail = 0.25 kN/mm.
 - Height of Rail = 80mm.
 - Minimum Hook approach = 1.00 mt.
- (40 Marks)

Draw to a suitable scale :

- Plan details.
 - Side elevation.
 - Section through Gantry.
- (30 Marks)
- 4 Design a welded plate girder of span 24 mt, carrying super imposed load of 50kN/m and two concentrated loads of 150 kN each at one third points of the span. Assume the girder as laterally supported throughout and yield strength = 250 MPa. Provide two curtailments. (40 Marks)

Draw to a suitable scale :

- Plan for full span (sectional)
 - Front Elevation.
 - Cross section at support and mid span.
- (30 Marks)
