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10CV82

Eighth Semester B.E. Degree Examination, Dec.2018/Jan.2019

Design and Drawing of Steel Structures

Time: 4 hrs. Max. Marks:100

Note: **I.** ***Answer any ONE full question, each from PART-A and PART-B.***
2. ***Use of IS-800, SP(6)-1 and steel tables is permitted.***

PART — A

1 a. An ISMB 350 is connected to the flange of column ISHB 400 using 20 mm diameter black bolts of Grade 5.6. Two angles ISA 110 x 110 x 8 mm were used thr framed connection. The length of angle is 260 mm. Four bolts were used to connect the angles with the column. Also another set of four bolts were used to connect angles with the web of the beam. Draw to a suitable scale.
i) Front view and
ii) Side view with all details. **(15 Marks)**

b. A stiffened seated connection has the following details. An ISMB500@869 N/rn is connected to the web of column ISHB300@630 N/m using welds. The clip angle ISA 100 × 100 × 6 mm of length 120 mm was used. The size of weld was 5 mm. The seat plate of size 200 x 90 x 18 mm stiffening plate of thickness 12 mm and length 180 mm was used. The width of stiffener plate was equal to the width of seat plate and reduced to 50 mm at the bottom. Use 12 mm fillet weld. Draw to a suitable scale.
i) Front view and
ii) Side view **(15 Marks)**

2 a. A column section ISHB250@547N/m is supported over another column section ISHB300 @724 N/m. The bearing plate thickness 50 mm. Use splice plate of thickness 6 mm. Use 8 numbers of 20 mm bolt on one side of the joint for each flange. Draw to a suitable scale.
i) Front view and
ii) Side view **(15 Marks)**

b. A gusseted base for ISHB400@822 Mtn with flange plate of 300 x 12 mm one on each flange to be detailed with the data.
i) Base plate 720 x 720 x 16 mm
ii) Gusset plate 16 mm thick and 360 mm depth
iii) Gusset angles 2ISA 150 x 115 x 15 mm
Gusset plate and the flange plate connected by 10 bolts on one side of columns. Provide 12 bolts for connecting gusset plate to gusset angle. Diameter of bolts 20 mm. Draw to a suitable scale.
i) Sectional elevation
ii) Side view **(15 Marks)**

PART — B

3 Design a welded plate girder to carry a superimposed load of 50 kN/m and two concentrated loads of 200 kN each at one third span points. The effective span of the plate girder is 20 m. Assume that the girder is laterally supported throughout its length. **(40 Marks)**

Draw to a suitable scale.
i) Half sectional elevation
ii) Cisection at midspan and at support **(30 Marks)**

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4 Design a simply supported Gantry girder to carry a superimposed load for the following data:
Span of the girder — 20 m
Span of the gantry girder = 7 m
Capacity of the crane = 220 kN
Self weight of crane excluding the crab = 200 kN
Weight of the crab = 60 kN
Wheel base distance = 3.4 m
Minimum hook approach = 1.1 in
Self weight of rail = 0.3 kN/m
Height of rail = 75 min (40 Marks)

Draw to a suitable scale:
i) C/section of the gantry girder
fi) Plan details (30 Marks)