R13

Code No: 126DY

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, May - 2017

STEEL STRUCTURES DESIGN AND DRAWING

(Common to CE, CEE)

Time: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

1.a)	What is structural steel? Write its use in engineering structures.	[2]
b)	What is lap joint? What are the different types of lap joints?	[3]
c)	Define slenderness ratio?	[2]
d)	What is strut? What are the common sections used as strut?	[3]
e)	What are the different types of beam sections?	[2]
f)	What do you understand laterally restrained beams? Explain with diagram?	[3]
g)	What is roof truss? What are the different parts of roof truss?	[2]
h)	What are purlins? Write its use.	[3]
i)	What is the maximum spacing of vertical stiffener in plate girder?	[2]
j)	What is the permissible stress in bending for rolled steel I-section beam?	[3]

PART-B

(50 Marks)

2. Calculate the strength of a 20mm diameter bolt of grade 4.6 for the following cases. The main plates to be jointed are 12mm thick.
a) Lap joint
b) Single cover butt joint, cover plate being 10mm thick. [5+5]

OR

3. A 120mm diameter and 6mm thick pipe is fillet welded to a 14mm plate. It is subjected to a vertical factored load of 4.5kN at 1m from the welded end and a factored twisting moment of 1.8kN-m. Design the joint assuming shop welding and steel grade Fe410. [10]

4. Design a double angle discontinuous strut to carry a factored load of 135kN. The length of strut is 3m between intersections. The two angles are placed back to back (with long legs are connected) and are tack bolted. Use steel grade Fe410.
a) Angles are placed on opposite side of 12mm gusset plate.
b) Angles are placed on same side of 12mm gusset plate. [5+5]

OR

5. Design a single angle strut for a roof truss carrying a compressive load of 80kN. The length of strut between centre to centre is 354cm. Also deign the welded connection. [10]

6. Design a laterally supported beam of effective span 6m for the following data.
Grade of steel = Fe410
Maximum bending moment M = 150kNm
Maximum shear force V=210kN
Check for deflection is not required. [10]

OR

7. A simply supported steel of 5m effective span is laterally supported throughout. It carries a total uniformly distributed load of 50kN (including self-weight). Design an appropriate section using steel grade Fe410. [10]

8. Design a stiffened seated connection for an ISMB 350 @ 514N/m with the column section ISHB 300 @ 576.8N/m. the beam transmits an end reaction of 320kN due to factored loads. The steel is of grade of Fe410. [10]

OR

9. Design a seat connection for the factored beam end reaction of 110kN. The beam section is ISMB 250 @ 365.9 N/m connected to the flange of column section ISHB200 @ 365.9 N/m using bolted connection. Steel is of Fe410 and bolts are of grade 4.6. [10]

10. A column section ISHB 250@ 500.3 N/m carries an axial load of 600kN. Design the column splices. [10]

OR

11. Design a welded simply supported plate girder for a span of 30m. The girder is loaded with uniformly distributed load of the intensity 35kN/m due to dead and live loads. [10]

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