

Code No: 126DY**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year II Semester Examinations, July - 2023****STEEL STRUCTURES DESIGN AND DRAWING****(Civil Engineering)****Time: 3 hours****Max. Marks: 75****Note:** i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

iv) Use of IS 800 and steel tables is allowed.**PART - A****(25 Marks)**

- 1.a) Define the efficiency of a joint. [2]
- b) What is the Prying action with respect to bolted connections? [3]
- c) What is an imperfection factor? [2]
- d) What are the different types of column bases? [3]
- e) What are the various factors influencing the bending strength of a beam section. [2]
- f) What is the necessity of built-up columns? [3]
- g) What is an eccentric connection? [2]
- h) What are the different types of stresses developed in fasteners of bracket connections? [3]
- i) What are the functions of bearing stiffeners? [2]
- j) What is the necessity of flange splice and web splice? [3]

PART - B**(50 Marks)**

2. Design the welded connection for a tension member, consisting of two ISA 90×90×10, subjected to a factored axial load of 300 kN. The angles are connected to either side of a 12 mm thick gusset plate. [10]
- OR**
3. Design a single angle section tension member of length 2.5 m subjected to a factored axial force of 250 kN. Use bolts of grade 4.6. [10]
4. Design a battened column of length 8 m, consisting of two channels back-to-back, subjected to an ultimate axial load of 1250 kN. The column is to be restrained against rotation and translation at one end and restrained against translation only at the other end. [10]
- OR**
5. Design a slab base of a column ISHB 250@ 510 N/m carrying an axial factored load of 900 kN. The column is supported on a M30 grade concrete pedestal. [10]

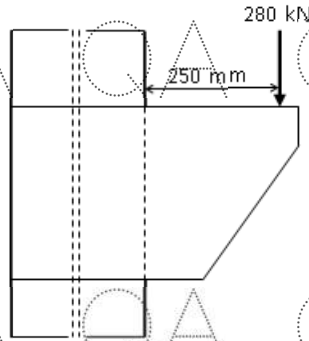
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6. Design a simply supported beam of effective span 4.8 m subjected to a factored concentrated load of 125 kN at its mid-span in addition to udl of 30 kN/m over its entire span. Assume the beam laterally supported. [10]

OR

7. Design a simply supported beam section of effective span 6 m subjected to factored udl of 90 kN/m. Use ISHB 350@724 N/m. [10]

8. Design a bracket type of welded connection shown in figure. The column is of ISHB 300 @ 500 N/m. The depth of bracket plate is 300 mm and its thickness is 12 mm. [10]



OR

9. Design an unstiffened seat connection to transfer a factored reactive force of 250 kN from a beam ISMB 350@524 N/m to a column ISHB 400 @774 N/m. [10]

10. Design a simply supported plate girder of span 25 m and subjected to an imposed load of 90 kN/m over its entire span. [10]

OR

11. A simply supported plate girder of span 20 m is subjected to uniformly distributed load of 125 kN/m over its entire span in addition to the self-weight. The section of the plate girder consists of each flange 500 mm × 20 mm and web plate 2400 mm × 12 mm. Design the necessary intermediate stiffeners. [10]

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