



MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

III B.Tech II Sem Regular End Examination, June 2022

Structural Engineering – II (Civil Engineering)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part – A, answer all questions which carries 20 marks.

3. In Part – B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

4. Assume grade of steel = Fe410, $f_{ub}=400\text{N/mm}^2$, $f_y=250\text{N/mm}^2$

PART- A

(10*2 Marks = 20 Marks)

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|-------|---|----|-----|-----|
| 1. a) | List the types of failures occur in bolt joint | 2M | C01 | BL1 |
| b) | What is slip factor and prying action? | 2M | C01 | BL1 |
| c) | Write down the limiting slenderness ratio for a tension member | 2M | C02 | BL1 |
| d) | What do you mean by web buckling | 2M | C02 | BL1 |
| e) | Define shape factor | 2M | C03 | BL1 |
| f) | What is laterally unsupported beam? Give an example | 2M | C03 | BL1 |
| g) | Justify the purpose for providing the bearing stiffener and where it is used? | 2M | C04 | BL4 |
| h) | State the necessity of curtailment of flange plates in plate girder | 2M | C04 | BL1 |
| i) | Write the different types of roof truss | 2M | C05 | BL1 |
| j) | Define bracing and Why bracings required in roof trusses | 2M | C05 | BL1 |

PART- B

(10*5 Marks = 50 Marks)

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|-----------|---|-----|-----|-----|
| 2. a) | Describe about the following: Design philosophies for structural steel | 5M | C01 | BL2 |
| b) | Show the various limit states to be considered in design of steel structures | 5M | C01 | BL3 |
| OR | | | | |
| 3. | A tie member of a roof truss consists of 2 ISA 90 mm X 60 mm X 10 mm. The angles are connected on either side of 12 mm gusset plate and the member is subjected to a pull of 400kN. Design the welded connection. | 10M | C01 | BL3 |
| 4. | Design a single angle equal section 100x100x10 mm, connected to a gusset plate at the ends with 20mm diameter bolts with the connection length of 250mm to transfer tension. | 10M | C02 | BL6 |

OR

- 5 A batten column of 10-m long is carrying a factored load of 1150 kN. The column is restrained in position but not in direction at both ends. Design a built up column using channel sections placed back to back 10M C02 BL3
- 6 Calculate the design bending strength of ISLB 300 @ 0.369 kN/m considering the beam to be (a) Laterally supported 10M C03 BL3
Assume the design shear force is less the design shear strength and is of low shear. The effective length of the beam (LLT) is 4 m. Assume Fe410 grade of steel.
- OR**
- 7 A hall 10 m x 24 m is covered with an RC slab 150 mm thick supported on rolled steel beam spread at 4 meter apart. If the live load is 3 kN/m² design the beam as per IS800. Walls all round are 230 mm thick. 10M C03 BL3
- 8 A plate girder of span 21 m is made-up of web plates of 1500 mm x 8 mm flange angles 150 mm x 115 mm x 10 mm and two flange plates 480 mm x 10 mm it carries a uniformly distributed load of 120 kN/m including its own weight. Identify the suitable design and sketch the web splices at 5 m from one end 10M C04 BL3
- OR**
- 9 Design welded plate girder to carry a superimposed load of 83 kN/m on an effective span of 32 m and with details neatly sketch the cross section and longitudinal section 10M C04 BL6
- 10 Design the purlin for the following data: 10M C05 BL6
Spacing of trusses = 6.1 m
Spacing of purlin = 2.8 m
Live load on galvanized iron roofing sheets = 0.7 kN/m²
Wind load = 1.6 kN/m²
Slope of main rafter = 32°
- OR**
- 11 Design of gantry girder for an electric overhead crane with the following data: 10M C05 BL6
Capacity of crane = 100 kN. Weight of trolley = 40 kN, Weight of crane girder = 200 kN, Span of crane girder = 18 m. Centre to Centre distance between columns = 8 m, Minimum clearance between trolley and gantry girder = 1.2 m centre distance of crane wheels = 3 m