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| **Guru Nanak Dev Engineering College, Ludhiana** | | | | | | | | | | |
| **Department of Civil Engineering** | | | | | | | | | | |
| **Program** | | | B.Tech. (CE) | | **Semester** | | | 8th | | |
| **Subject Code** | | | PECE-136 | | **Subject Title** | | | Design of Steel Structures | | |
| **Mid Semester Test (MST) No.** | | | 2 | | **Course Coordinator(s)** | | | Sukhwinder Singh | | |
| **Max. Marks** | | | 24 | | **Time Duration** | | | 1 hour 30 minutes | | |
| **Date of MST** | | | 26 April’ 2024 | | **Roll Number** | | |  | | |
| **Note:** Attempt all questions | | | | | | | | | | |
| **Q. No.** | **Question** | | | | | | | | **COs, RBT level** | **Marks** |
| Q1 | Why unequal angles with long legs connected are more efficient for tension members? | | | | | | | | CO1, L2 | 2 |
| Q2 | An I section beam is fabricated with plates of following dimensions:  Flanges: 600 x 20 mm  Web: 1600 x 12 mm  Classify flanges, web and the section. Also determine the plastic moment capacity of the beam about its both the axis, if the grade of steel is Fe 410. | | | | | | | | CO1, L4 | 2 |
| Q3 | Design a tension member 3.4 m between c/c of intersections using double angle section and carrying a factored pull of 200 kN. The member is subjected to reversal of stresses. Draw a neat section of the member. | | | | | | | | CO3, L6 | 4 |
| Q4 | A steel floor beam in a building has a span of 6.0 m. It is supported over supports and carries a uniformly distributed load of 40 kN/m, inclusive of self weight. Design and draw the beam section when the compression flange is restrained throughout the span against lateral bending. | | | | | | | | CO4, L6 | 4 |
| Q5 | Determine the node forces caused by the wind and gravity loads for the Fink type roof truss for an industrial building for the following data:    Overall length of the building = 42 m  Span of Truss = 16 m  c/c spacing of truss = 7 m  Rise of Truss = L/5  Self-weigth of purlins = 300 N/m  Eave height = 10 m  Roofing covering, Asbestos sheets = 170 N/m2  The building is located in outskirts of Ludhiana city. | | | | | | | | CO5, L4 | 4 |
| Q6 | A column ISHB 350 @ 661.2 N/m carries an axial compressive factored load of 1900 kN. Design a suitable gusset base. The base rests on M-15 grade of concrete. Also draw neat section of the column and its base. | | | | | | | | CO3, L6 | 8 |
| **Course Outcomes (CO)**  *Students will be able to* | | | | | | | | | | |
| 1 | Apply knowledge about various properties of steel sections to decide their appropriate use for a given design problem | | | | | | | | | |
| 2 | Design bolted and welded connections for different type of given loads | | | | | | | | | |
| 3 | Design tension and compression members including colu mn bases for given loading | | | | | | | | | |
| 4 | Design flexural members including build up sections for given loading | | | | | | | | | |
| 5 | Assess design loads for a given roof truss and design its various components viz. rafter, web members, purlins etc. | | | | | | | | | |
| 6 | Interpret steel structural drawings | | | | | | | | | |
| **RBT Classification** | | **Lower Order Thinking Levels (LOTS)** | | | | | **Higher Order Thinking Levels (HOTS)** | | | |
| **RBT Level Number** | | L1 | | L2 | | L3 | L4 | | L5 | L6 |
| **RBT Level Name** | | Remembering | | Understanding | | Applying | Analyzing | | Evaluating | Creating | |

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| Q5 | Determine the node forces caused by the wind and gravity loads for the Fink type roof truss for an industrial building for the following data:    Overall length of the building = 42 m  Span of Truss = 16 m  c/c spacing of truss = 7 m  Rise of Truss = L/5  Self-weigth of purlins = 300 N/m  Eave height = 10 m  Roofing covering, Asbestos sheets = 170 N/m2  The building is located in outskirts of Ludhiana city. | | | | | | | | CO5, L4 | 4 |
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