Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18CE3022** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED STEEL DESIGN** | **Max. Marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Discuss the following terms:   1. Types of buckling failure in beam and column. 2. Lateral torsional buckling. 3. Failure of bolt and weld connections. | CO6 | 16 |
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| 2. |  | Analyze the lateral torsional buckling capacity of laterally unrestrained column section ISHB 350, Length of column 3m. | CO3 | 16 |
|  |  |  |  |  |
| 3. |  | Design the moment resistant connection to join ISMB 350 with a column section ISHB 450. The beam transmits an end reaction of 150kN and bending moment of 50kNm due to factored loads. | CO4 | 16 |
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| 4. |  | Determine the critical loads on the pitched roof truss for the following data  Height of the column –6m  Span of the truss - 15m  Height of the truss - 2.5m  Spacing of the truss - 4m c/c  Spacing b/w purlin - 2m c/c  Assume the roof covered with GI sheets and the building located in Chennai. | CO3 | 16 |
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| 5. | a. | Develop the shape factor for the following sections:  i) Rectangular section.  ii) Circular section. | CO1 | 10 |
| b. | Illustrate the moment rotation behaviour and explain the plastic analysis of the section. | CO2 | 6 |
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| 6. |  | A four story steel building is located in seismic zone V on medium soil. The framing system of the building is moment-resisting frame without brick masonry infill panels. Estimate the base shear and its distribution along the height of the building. Column sections: ISHB 350@72.4kg/m, Beam sections: ISMB300 @44.2kg/m Slab: 125mm thick RCC slab on all floors. Size of building 30x30m, Height of each floor - 3m, Live load - 2.5kN/m2. Assume the relevant data. | CO2 | 16 |
| 7. |  | Determine the load carrying capacity of welded plate girder column section in a pre-engineered building. Length of the column is 4m. Assume the column is pinned at both ends.  Width of flange – 250mm  Thickness of flange – 10mm  Depth of web – 400mm  Thickness of web – 8mm | CO4 | 16 |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Classify the steel sections based on local buckling and explain the concepts. | CO5 | 5 |
| b. | Two channels of 180mmx80mm section with bent lips are connected with webs to act as beam. The thickness of the plate is 2.5mm and the depth of the lip is 25mm. The beam has an effective span of 4.5m. Determine the load carrying capacity of beam. Take fy-235N/mm2. | CO6 | 15 |