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



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

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| **Code :** | **14CE2013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DESIGN OF STEEL STRUCTURES** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** |  | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. |  | Determine the strength of the weld for the following data.  i) Single angle section welded on the plate for 400 mm length  ii) Double angle section welded on the plate for 800 mm length  iii) Plate section with plate for 600mm length  Size of the weld - 3mm  Ultimate strength of weld - 410N/mm2. | CO3 | 20 |
| **(OR)** | | | | |
| 2. |  | Estimate the capacity of the bolt for the following details.  12mm dia bolt of grade 4.4 connected with the plate of 8mm thickness by lap joint. Ultimate tensile strength of bolt - 410N/mm2 , Ultimate tensile strength of plate -400 N/mm2, Pitch - 30mm and End distance - 50mm. | CO2 | 20 |
|  |  |  |  |  |
| 3. |  | Examine the tension capacity of an double angle section ISA 150X150X8 mm in a truss member carrying a tension load of 150kN.  Ultimate tensile strength of steel - 410N/mm2  Yield strength of steel - 250 N/mm2  Assume the section is welded on the gusset plate of thickness 10mm. | CO2 | 20 |
| **(OR)** | | | | |
| 4. |  | Design the lacing system for the following data.  Axial load – 800kN  Effective length of column – 6m (Both ends pinned)  Fe 410 steel, Assume the relevant design detail. | CO2 | 20 |
|  |  |  |  |  |
| 5. |  | Analyse the axial compression load carrying capacity of the section ISHB 300 for the following data.  Length of column Z-Z direction – 3.5m  Yield strength of steel – 250 MPa  (Assume the column ends are fixed). | CO3 | 20 |
| **(OR)** | | | | |
| 6. |  | Determine the bending and shear strength of Beam section ISMB 300 considering the beam as laterally restrained. Dead load from the slab 12kN/m, Live load from the beam 8kN/m. Span of the beam 4m and Fe 410 steel. | CO2 | 20 |
|  |  |  |  |  |
| 7. |  | Design the welded plate girder equal I section for the following data  Calculate the bending and shear capacity of the section  Span - 6m  Max Bending moment - 80kNm  Max shear force - 40kN. | CO2 | 20 |
| **(OR)** | | | | |
| 8. |  | Analyse the truss for the following data  Determine the loads (dead, live and wind) on the pitched roof truss for the following data  Height of the column - 6m  Span of the truss - 12m  Height of the truss - 2.5m  Spacing of the truss -3m  Spacing b/w purlin - 1.5m c/c  Assume the roof covering sheets and the building located in delhi. | CO2 | 20 |
|  | | **Compulsory**: |  |  |
| 9. |  | Design the purlin for the following data  Dead load on purlin – 5kN/m  Live load on purlin – 1kN/m  Wind load on purlin – 5kN/m  Span of purlin- 3m, Spacing b/w purlin - 1.6m c/c.  Fe 410 steel, Check the moment and shear capacity of the section (Assume relevant steel section as purlin). | CO2 | 20 |