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

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**End Semester Examination – Nov/Dec – 2018**

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

**(IS 800-2007, IS SP 6-1/Steel tables book are permitted)**

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Bringout the merits and demerits of bearing type of bolted connections. | CO1 | 5 |
| b. | Estimate the strength of a double cover butt joint for connecting two plates of 12mm thickness connected by cover plates of thickness 10mm. Use M20 bolts of grade 4.6 and Fe 410 plates are to be used. | CO2 | 15 |
| (OR) | | | | |
| 2. | a. | Classify different types of steel section based on local buckling capacity? | CO1 | 5 |
| b. | A tie member of a roof truss consists of 2 ISA 75 x 75 x 8mm.The angles are connected to either side of a 10mm gusset plates and the member is subjected to a working pull of 300kN. Design the welded connection. Assume the connections are made in the workshop. | CO2 | 15 |
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| 3. | a. | What is shear lag and when it is likely to occur in tension members? | CO1 | 5 |
| b. | Describe the suitable section to carry a tension load of 150kN. Check the yielding and rupture capacity of the section. | CO3 | 15 |
| (OR) | | | | |
| 4. | a. | Furnish the reasons, why the shapes and sizes of rolled sections are limited in providing an economical column. | CO1 | 5 |
| b. | Determine the axial load carrying capacity in compression of the column shown in Fig.1 fy - 250MPa, Length - 6m, Both ends hinged.  Fig. 1 | CO2 | 15 |
| 5. |  | A simply supported steel beam of 4.0m effective span is laterally supported throughout. It carries a total uniformly distributed load of 40kN/m (inclusive of self weight). Design an appropriate section using steel of grade Fe 410. | CO2 | 20 |
| (OR) | | | | |
| 6. | a. | Bring out the circumstances under which resistance to lateral buckling need not be checked in Laterally unsupported beams. | CO1 | 5 |
| b. | Design the column base for the column section ISHB 350@72.4kg/m subjected to a factored axial compressive load of 1000kN. The slab base rests on concrete pedestal of grade M30. | CO2 | 15 |
|  |  |  |  |  |
| 7. |  | Design a welded plate girder for a simply supported bridge deck beam with clear span of 15m, subjected to the following:  Dead load including self weight =15kN/m, Imposed load = 10kN/m  Assume that the top compression flange of the plate girder is restrained laterally. Design as an unstiffened plate girder. | CO2 | 20 |
| (OR) | | | | |
| 8. |  | Analyse the Pratt truss shown in figure for the following data:    Determine the loads (dead, live and wind) on the Pratt roof truss for the following data  Height of the column - 5m  Span of the truss - 12m  Height of the truss - 2.5m  Spacing of the truss - 4m  Spacing b/w purlin - 1.5m c/c  Assume the roof covered with AC sheets and the building located in Chennai. | CO2 | 20 |
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|  | | **Compulsory**: |  |  |
| 9. |  | Analyse the gantry girder for the following data  Span of gantry girder - 7.5m  c/c distance between gantry rails - 12m  Crane capacity - 250kN  Self weight of the crane girder excluding trolley - 150kN  Self weight of the trolley, electric motor, hook etc - 50kN  Self weight of rail section - 250N/m  Approximate minimum approach of the crane hook to the gantry girder - 1.5m  Wheel base - 3m  Diameter of crane wheels - 150mm | CO3 | 20 |