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



**End Semester Examination – Nov/Dec– 2017**

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| **Code :** | **14CE2037** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED DESIGN OF STEEL STRUCTURES** | **Max. marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Two plates 18 mm thick and are joined by i. double U Butt weld, ii. single U Butt weld. Determine the strength of welded joint in tension in each case. Effective length of weld Lw is 150 mm. Assume Fe 410 grade plates and shop welds are used. | CO1 | 10 |
| b. | Write the step by step procedure for the design of bolted connection under axial load condition. | CO1 | 10 |
| (OR) | | | | |
| 2. |  | An ISLB 300 transmits an end reaction of 300kN, under factored load, to the web of ISMB 450. Design a bolted framed connection. Steel is of grade Fe 410 and bolts are of grade 4.6. Assume relevant data if required. | CO1 | 20 |
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| 3. |  | Design a stiffened seat connection for ISMB 350 transmitting an end reaction of 200 kN due to factored loads to a column section ISHB 300. The steel is of grade Fe 410 and bolts of grade 4.6. Assume relevant data if required. | CO1 | 20 |
| (OR) | | | | |
| 4. |  | Design a unstiffened seat connection for a factored beam end reaction of 110 kN. The beam section is ISMB 250 connected to the flange of column section ISHB 200 using bolted connection. Steel is of grade Fe 410 and bolts of grade 4.6. | CO1 | 20 |
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| 5. |  | Design a purlin on a sloping roof truss for a clear span of 7 m being supported on 400mm thick wall. The spacing of the truss is 4.5 m center to center. The purlins are simply supported on the rafer at a slope of 30o. | CO2 | 20 |
| (OR | | | | |
| 6. | a. | Write short note on composite structures. | CO3 | 6 |
|  | b. | Explain the major components of an industrial building with the help of neat sketches. | CO2 | 14 |
|  |  |  |  |  |
| 7. |  | A 60 m high microwave antenna lattice tower is to be built near Agra where the terrain at the site is nearly a level ground with terrain of category 2. The diameter of the Hemi-spherical antenna disc, fixed at the top is 3 m. The width of the tower at the top has to be 3 m. Select a suitable configuration for the tower and calculate the lateral load for the following data:  Weight of antenna & fixtures : 9 kN  Weight of platform at top : 0.82 kN/m2  Weight of railing at top : 0.30 kN/m2  Weight of ladder and the cage : 0.65 kN/m  Weight of Miscellaneous items: 2.5 kN (such as beacon, lights, lightening cables etc.) Assume relevant data if required. | CO2 | 20 |
| (OR) | | | | |
| 8. | a. | Write short note on sway and non-sway frames. | CO3 | 7 |
|  | b. | Explain lattice tower configurations and bracings with the help of neat sketches. | CO2 | 7 |
|  | c. | Sketch a neat diagram of self-supporting steel stack and label its parts. | CO2 | 4 |
|  | d. | Define solidity ratio. | CO2 | 2 |
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|  | | **Compulsory:** |  |  |
| 9. |  | Design a simply supported composite beam with 8 m span and spaced at 4m. The thickness of the slab is 125 mm. The floor is to carry an imposed load of 3 kN/m2 and floor finish load of 0.5 kN/m2. Take construction load as 0.75 kN/m2. fck = 30 N/mm2 and fy= 250 N/mm2. Assume relevant data if required. | CO3 | 20 |

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