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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 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. | Write the step by step procedure for the design of welded connection under axial load condition. | CO1 | 12 |
| b. | List out the advantages and disadvantages of welded connections. | CO1 | 4 |
| c. | List the possible modes of failure of bolted connection with neat sketches. | CO1 | 4 |
| (OR) | | | | |
| 2. |  | An ISLB 300 transmits an end reaction of 250kN, 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 |
| 3. |  | Design a stiffened seat connection for ISMB 350 transmitting an end reaction of 300 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. | a. | Design aunstiffened seat connection for a factored beam end reaction of 100 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 | 15 |
|  | b. | Explain the types and major components of a roof truss with the help of neat sketches. | CO 2 | 5 |
| 5. | a. | Design a purlin on a sloping roof truss for a clear span of 9 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. | CO 2 | 15 |
|  | b. | Write short note on composite structures. | CO3 | 5 |
| (OR) | | | | |
| 6. | a. | Differentiate web buckling and web crippling. | CO 2 | 4 |
|  | b. | Explain the concept of steel concrete composite beams. | CO 2 | 6 |
|  | c. | Explain the major components of an industrial building with the help of neat sketches. | CO2 | 10 |
| 7. |  | A 50 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 |
|  | | **Compulsory:** |  |  |
| 9. |  | Design a simply supported composite beam with 9 m span and spaced at 3.5 m. 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 |

ALL THE BEST