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 :** | **14CE3004** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED DESIGN OF REINFORCED CONCRETE 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. | A reinforced concrete beam of rectangular section with a width of 350mm and overall depth of 700mm is subjected to an ultimate torsional moment of 100kN.m together with an ultimate bending moment of 200kN.m. Adopt M20 concrete and Fe415 HYSD bars. Assume top and bottom covers of 50mm and side covers of 25mm. Design the section for torsion. | CO1 | 12 |
| b. | Reason out the cracking behavior in Reinforced concrete flexural member. | CO1 | 8 |
| (OR) | | | | |
| 2. | a. | Discuss the Flexural behavior of the section and the method to determine the neutral axis of various section. | CO1 | 8 |
| b. | A simply supported rectangular beam of 200mm wide by 450mm overall depth is reinforced with 3 bars of 16mm diameter at an effective depth of 420mm. Two hanger bars of 12mm diameter are provided at the compression face. The effective span of the beam is 5m. The beam supports a live load of 10kN/m. Use M20 concrete and Fe415 steel. Compute the short term deflection. | CO1 | 12 |
| 3. |  | Obtain plastic resistance of a composite section made of steel section ISHB 250 encased in concrete of 350 x 350mm with reinforcement of 0.35% gross area. The column height is 3m and is pin ended. Use M20 concrete and Fe415 steel. | CO1 | 20 |
| (OR) | | | | |
| 4. | a. | Design an interior panel of a flat slab of size 6m x 6m without providing drop and column head. Column size is 600mm x 600mm and live load on panel is 4kN/m2 and floor finish 1kN/m2. Use M20 concrete and Fe415 steel. | CO1 | 12 |
|  | b. | Discuss the design procedure of an Uni-axially loaded tubular composite column. | CO1 | 8 |
| 5. | a. | Design a regular octagonal slab of sides 2m, subjected to a load of 3kN/m2 and floor finish as 1kN/m2. The slab is simply supported all around. Use M20 concrete and Fe415 steel. | CO1 | 14 |
|  | b. | Discuss the assumptions made in folded plate design. | CO1 | 6 |
| (OR) | | | | |
| 6. |  | A hall of size 5 x 6m is covered by a sloped roof with 1.6m rise. The roof is to be supported on 230mm thick wall. Design the sloping roof for a live load of 0.75kN/m2 and due to tiles on roof is 1.5kN/m2. Use M20 concrete and Fe415 steel. | CO1 | 20 |
| 7. |  | Design the side walls and hopper bottom of a 3.5m x 3.5m square bunker to store 30 tonnes of coal. Density of coal = 9kN/m3. Angle of repose is 300. Use M20 concrete and ribbed tor steel. | CO1 | 20 |

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| (OR) | | | | |
| 8. | a. | Explain the procedure adopted in the design of chimneys and draw typical cross section showing details of reinforcement. | CO1 | 10 |
|  | b. | Discuss the inelastic analysis of a two span continuous reinforced concrete beam. | CO1 | 10 |
|  | | **Compulsory:** |  |  |
| 9. |  | A reinforced concrete grid floor is to be designed to cover a floor area of 12m x 18m. The spacing of the ribs in mutually perpendicular directions is 1.5m c/c. Live load on floor is 3kN/m2. Adopt M20 grade concrete and Fe415 grade HYSD bars. Assume ends are simply supported. Analyse the grid floor by IS456 method and design suitable reinforcements in the grid floor. | CO1 | 20 |