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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

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

**Supplementary Examination – June – 2017**

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| **Code :** | **14CE2029** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED 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. | The interior panel of a roof slab has to be designed for an IT building. The panel is of size 4 m x 4 m and the system is to be designed without beams. Design a suitable floor slab for a live load of 3.5kN/m2. The floor is supported by columns of size 400 mmx400 mm. Use M20 concrete and Fe 415 steel. Sketch the reinforcement details | CO2, CO3 | 18 |
| b. | Enlist the locations where a flat slab system is designed | CO1 | 2 |
| (OR) | | | | |
| 2. |  | Design the exterior panel of a flat slab of size 5 m x 5 m with suitable drop to support a live load of 4 kN/m2. The floor system is supported by columns of size 500 mmx500 mm. Floor to floor distance is 3.2m. Use M20 concrete and Fe 415 steel. | CO2, CO3 | 20 |
| 3. |  | Determine the reinforcement required for a simply supported RC slab designed for the deck of a road bridge having the following data:  Clear width of roadway = 7.5m  Foot paths = 1m on either side  Clear span = 5 m  Width of bearing = 300mm  Thickness of wearing coat = 80mm  Type of loading: IRC class AA or A, whichever gives the worse effect.  Materials: M25 grade of concrete, Fe 415 grade HYSD bars | CO2 | 20 |
| (OR) | | | | |
| 4. |  | Estimate the design moments and shear for the deck slab of a T-beam girder bridge to suit the following data: Clear roadway =7.5m. Effective span of T-beam =12 m. M20 grade of concrete and Fe 415 HYSD bars | CO2 | 20 |
| 5. | a. | The load from the girder is to be transferred to the column of size 300mmx300mm. Design a suitable system to carry a factored load of 400kN at a distance of 150mm from the face of the column. Use M25 concrete and Fe-415 bars. | CO2, CO3 | 14 |
|  | b. | Derive the expression for design tensile force in a typical corbel. | CO1 | 6 |
| (OR) | | | | |
| 6. | a. | Discuss the concept of deep beam. Differentiate between a simple beam and deep beam. | CO1 | 6 |
|  | b. | Design a simply supported deep beam of width 300mm and 3m deep over a clear span of 5m. The beam carries a load of 300kN/m and is supported on walls of 500mm thick on each end. Use M20 concrete and Fe 415 steel. | CO2,CO3 | 14 |
| 7. |  | A reinforced concrete grid floor is to be designed to cover a floor area of size 12mx15m.The spacing of ribs in mutually perpendicular direction being 1.5mc/c. Live load to be considered is 1.5kN/m2.Materials to be used are M20 concrete and Fe-415 steel. Analyze the grid floor for moments and shears using IS method and design suitable reinforcements. | CO2,CO3 | 20 |
| (OR) | | | | |
| 8. |  | Design a reinforced grid floor for a hall has a size of 9mx12m.The ribs are spaced 1.5mc/c in mutually perpendicular direction. Live load on the floor is 2kN/m2.Use M20 & Fe415 steel. Analyse the grid floor by rankine grashoff method for moments and shear | CO2,CO3 | 20 |
| **Compulsory:** | | |  |  |
| 9. |  | Design a spherical shell for a circular room of 8m diameter with 200mm thick wall. Assume the incidental live load and finishes on the dome as 750N/m2 and 215N/m2.The dome carries a latern load of 10kN on a crown point. Use M20 concrete and Fe-415 steel. | CO2,CO3 | 20 |

ALL THE BEST