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**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **14CE2029** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED REINFORCED CONCRETE STRUCTURES** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Q. No. | Sub Div. | Questions | Course  Outcome | Marks |
| 1. | a. | Enlist the types of flat slabs. | CO1 | 2 |
| b. | Design the interior panel of a flat slab floor system for a floor 15 m x 15m divided into panels of 5m x 5m without drops, using the provisions of IS 456 for the direct design method.  Loading class = 4 kN/m2  Column size = 500mm diameter  Use M 25 grade concrete Fe 415 HYSD bars | CO2, CO3 | 18 |
| (OR) | | | | |
| 2. |  | Design the exterior panel of a flat slab floor system for a warehouse 20m by 20 m divided into panels of 5 m by 5m.  Loading class = 4 kN/m2  Column size = 400mm diameter  Use M 20 grade concreteFe 415 HYSD bars | CO2, CO3 | 20 |
| 3. | a. | List out the various IRC loading for bridge design with sketches. | CO1 | 6 |
| b. | A simply supported RC slab is required for the deck of a road bridge having the data given below:  Width of carriage = 7.5 m  Width of kerb = 600mm  Clear span = 6 m  Width of bearing = 400mm  Thickness of wearing coat = 80mm  Type of loading: IRC class AA Materials: M20 grade of concrete, Fe 415 grade HYSD bars. Determine the design moments and shear. | CO2 | 14 |
| (OR) | | | | |
| 4. |  | Design the longitudinal girder of T-beam girder bridge to suit the following data:  Clear roadway =7.5m. Assume three T-beams spaced at 2.5m intervals. Effective span of T-beam =12m. Assume cross beams at  4 m intervals. M20 grade of concrete and Fe 415 HYSD bars. | CO2 | 20 |
| 5. | a. | Explain the load transfer mechanism of corbel. | CO1 | 3 |
|  | b. | Discuss the means of enhancing the shear strength in corbel. | CO1 | 2 |
|  | c. | Design a corbel to support a gantry girder reaction of 400kN at service condition acting at a distance of 225mm from the face of a 400 x400 mm column. The concrete mix of grade M25 and HYSD steel of grade Fe415 are used for construction. | CO2,CO3 | 15 |
| (OR) | | | | |
| 6. | a. | Examine the arch and tie action in deep beams. | CO1 | 5 |
|  | b. | Design an interior span of a beam 500mm wide and 6 m deep simply supported over a clear span of 10m. The beam carries a UDL of 180kN/m at the service state and is supported on wall of 500mm thick on each end. Use M20 & Fe415 steel, assume the ends are simply supported. | CO2, CO3 | 15 |
| 7. |  | The roof of a conference hall is to be designed to cover a floor area of 18 m x 21 m. Live load on floor is 3.5 kN/m2. Design suitable floor system if no columns are to be provided in the interior region and the ends are simply supported. Adopt M20 and Fe 415. Assume suitable data. | CO2, CO3 | 20 |
| (OR) | | | | |
| 8. |  | A RC grid floor is to be designed to cover a floor area of 13 m x 17 m. The spacing of ribs in mutually perpendicular direction is 1.5 m c/c. Live load on floor is 2.5kN/m2. Adopt M30 and Fe 415. Assume the ends are simply supported. Analyze the grid floor by Rankine Grashoff Method and design suitable reinforcement in the grid floor. | CO2, CO3 | 20 |
| **Compulsory** | | |  |  |
| 9. | a. | Discriminate the conditions for use of domes and normal flat roofs. | CO1 | 5 |
|  | b. | Design a conical dome roof for a room with base diameter as 10m. The live load due to wind and snow may be taken as 900N/m2. The height of the roof is 3.5m. Use M20 concrete and Fe 415 steel. | CO2, CO3 | 15 |

ALL THE BEST