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



**End Semester Examination – Nov/Dec – 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. | Design the interior panel of a flat slab floor system for a warehouse 24 m x 24m divided into panels of 6m x 6m .  Loading class = 5 kN/m2  Materials = M 20 grade concrete  Fe 415 HYSD bars  Column size = 400mm diameter | CO2,CO3 | 17 |
| b. | Summarize the limitations of Direct Design method. | CO1 | 3 |
| (OR) | | | | |
| 2. | a. | Design the exterior panel of a flat slab of size 6 m x4m 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 3.6 m. Use M20 concrete and Fe 415 steel. | CO2,CO3 | 17 |
| b. | Write short notes on moment acting in exterior panel. | CO1 | 3 |
|  |  |  |  |  |
| 3. | a. | List out the various IRC loading for bridge design and discuss the conditions for Courbon’s method. | CO1 | 5 |
|  | b. | Analyse a simply supported RC slab is required for the deck of a road bridge having the data given below:  Width of carriage = 6 m  Width of kerb = 600mm  Clear span = 6 m  Width of bearing = 400mm  Thickness of wearing coat = 85mm  Type of loading: IRC class AA or A, whichever gives the worse effect.  Materials: M20 grade of concrete, Fe 415 grade HYSD bars | CO2 | 15 |
| (OR) | | | | |
| 4. |  | Analyse a 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 =18m. Assume cross beams at 4.5 m intervals. M20 grade of concrete and Fe 415 HYSD bars | CO2 | 20 |
|  |  |  |  |  |
| 5. | a. | A corbel attached to a 250mmx250mm RC column carries a factored load of 350kN at a distance of 180mm from the face of the column. Design the corbel using M20 concrete and Fe-415 bars. | CO2,CO3 | 16 |
|  | b. | Sketch the forces acting in corbel. | CO1 | 4 |
| (OR) | | | | |
| 6. | a. | A beam 3000mm deep and 300mm wide continuous over three spans with a clear span of 6000mm and the width of the support is 600mm,carries a uniformly distributed service load of 150kN/m. Design the beam using M 25 and Fe 415 steel | CO2,CO3 | 16 |
|  | b. | Recall the empirical expressions for lever arm (z) as per Indian standards in case of deep beams. | CO1 | 4 |
|  |  |  |  |  |
| 7. | a. | A RC grid floor is to be designed to cover a floor area of 10 m x 15 m. The spacing of ribs in mutually perpendicular direction is 1.5 m c/c. Live load on floor is 2.5 kN/m2. Adopt M20 and Fe 415. The depth of the toping slab is 90mm. Analyze and design the ribs of the grid floor using IS method. | CO2,CO3 | 17 |
|  | b. | Explain the concept of grid floor and comment on its uses. | CO1 | 3 |
| (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. | a. | Describe briefly on domes and identify its uses in civil engineering | CO1 | 3 |
|  | b. | Design a conical dome roof for a room with base diameter as 12m. The live load due to wind and snow may be taken as 1000N/m2. The height of the roof is 4m. Use M20 concrete and Fe 415 steel. | CO2,CO3 | 17 |

ALL THE BEST