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

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**End Semester Examination – Nov/Dec – 2018**

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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)**

**(IS Codes permitted for the exam : IS456:2000, IRC:21, IRC:6)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Discuss the advantages and disadvantages of flat slab over a rectangular slab. | CO1 | 4 |
| b. | Design a roof system without beams for the interior panel of size 4m x 4 m, for live load of 3.5 kN/m2. The floor supports column of size 300mm x 300mm. Sketch the reinforcement diagram for the slab system. | CO2,  CO3 | 14+2 |
| (OR) | | | | |
| 2. | a. | Explain the reason why punching shear is predominant in flat slab. | CO1 | 4 |
| b. | Design the exterior panel of a flat slab of size 5 m x5 m with suitable drop to support a live load of 4 kN/m2. The floor system is supported by columns of size 400 mm diameter. Floor height is 3.2 m. Use M20 concrete and Fe 415 steel.  Sketch the reinforcement diagram for the slab system. | CO2,  CO3 | 14+2 |
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| 3. | a. | Sketch the loading pattern of class B loading. | CO1 | 2 |
| b. | Design a simply supported RC slab required for the deck of a road bridge having the following data:  Clear width of roadway = 6 m  Foot paths = 1m on either side  Clear span = 5 m  Width of bearing = 400mm  Thickness of wearing coat = 80mm  Type of loading : IRC class AA  Materials: M30 grade of concrete, Fe 415 grade HYSD bars  Sketch the reinforcement diagram. | CO2,  CO3 | 16+2 |
| (OR) | | | | |
| 4. | a. | Enlist the conditions under which Courbon’s method is used for design of bridges. | CO1 | 2 |
| b. | Design the deck slab of a T-beam girder bridge to suit the following data:  Clear roadway =7.5m. Effective span of T-beam =20m. M20 grade of concrete and Fe 415 HYSD bars. Sketch the reinforcement diagram. | CO2,  CO3 | 16+2 |
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| 5. | a. | Explain the concept of concurrent forces in corbel. | CO1 | 4 |
| b. | A corbel attached to a 400mmx400mm RC column carries a factored load of 600kN at a distance of 250mm from the face of the column. Design the corbel using M20 concrete and Fe-415 bars.  Sketch the reinforcement diagram of the corbel. | CO2,  CO3 | 14+2 |
| (OR) | | | | |
| 6. | a. | Mention the condition under which a beam is termed as deep beam. Enlist the parameters that influence its behavior. | CO1 | 4 |
| b. | Design a continuous beam of width 500mm and 3.5m deep over a clear span of 6.5m. The beam rests on support of 0.8m and carries a load of 350kN/m including its self weight. Use M20 concrete and Fe 415 steel. Sketch the reinforcement diagram of the deep beam | CO2,  CO3 | 14+2 |
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| 7. |  | Design a suitable reinforced concrete floor to cover a floor area of size 18 m x 21m.The floor is to be free from columns. Live load to be considered is 4 kN/m2. Use M20 concrete and Fe-415 steel. Assume suitable data. Sketch the reinforcement details. | CO2,  CO3 | 18+2 |
| (OR) | | | | |
| 8. |  | A RC grid floor is to be designed to cover a floor area of 15 m x 15 m. The spacing of ribs in mutually perpendicular direction is 1.5 m c/c. Live load on floor is 3 kN/m2. Adopt M20 and Fe 415. Analyze and design the grid floor using Rankine Grashoff method.  Sketch the reinforcement details. | CO2,  CO3 | 18+2 |
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|  | | **Compulsory**: |  |  |
| 9. |  | Design a spherical dome for a circular room of 12 m diameter with 230mm thick wall. Assume the incidental live load and finishes on the dome as 9 kN/m2 and 1 kN/m2. Use M20 concrete and Fe-415 steel. Sketch the reinforcement diagram. | CO2,  CO3 | 18+2 |