**Karunya University**

**(Karunya Institute of Technology and Sciences)**

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

**Supplementary Examinations – June 2016**

**Subject Title: REINFORCED CONCRETE STRUCTURES Time : 3 hours**

**Subject Code: 14CE2009 Maximum Marks: 100**

**Answer ALL questions (5 x 20 = 100 Marks)**

1. Discuss briefly the various design philosophies for design of RCC structures.

**(OR)**

2. Design the interior panel of a slab of size 2.7 x 5 m to support a live load of 3 kN/m2. Use M20 and Fe415 steel

3. A rectangular beam of 7 m span (center to center of supports) resting on 300mm wide simple supports, is to carry a uniformly distributed load of 20kN/mm. Design the beam using Fe415 steel and M20 concrete.

**(OR)**

4. A T beam of 8m clear span, simply supported on 230mm wide wall supports a dead load of 20kN/m (including self-weight) and a live load of 25kN/m. the center to center distance of slab is 2.5m. Determine the dimensions of the beam and calculate the moment.

5. A column has an unsupported length of 3.4m. Effective length factor is 0.85. Diameter of the column is 400mm and is subjected to a factored load of 1500kN. Design the reinforcement if it is provided with i) lateral ties ii) Spiral reinforcement. Use M20 concrete and Fe415.

**(OR)**

6. Design a short square column with effective length of 3.0m capable of safely resisting the factored load effect of Pu= 1625kN, Mu = 75kNm.

7. Design an isolated footing for a column of size 500mm x 500mm carrying an axial load of 600kN. The safe bearing capacity of the soil is 120 kN/m2. Use limit state method of design. The grade of concrete is M20 and the grade of steel is Fe415.

**(OR)**

8. An underground parking has to be constructed where the soils bearing capacity is 160kN/m2 and density is 16kN/m3. The soil has to be dug for a depth of 4m. Design a suitable structure to enable the construction of the parking area. The angle of shearing resistance is 30o and coefficient of friction is 0.5.

9. **Compulsory:**

Design a suitable staircase for a residential building. The available space for the staircase is 2.6m, it consists of 18steps, each of 300mm tread and 180mm rise, with intermediate landing of 1.2m width at the middle. The width of staircase of the staircase is also 1.2m. The flights are having equal number of steps. Design and detail the staircase. Use M20 concrete and Fe415 steel.