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 – Nov/Dec – 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **14CE3018** | **Duration :** | **3hrs** |
| **Sub. Name :** | **Design of Substructures** | **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. | Discuss about the reasons for failure of foundations and selection of a good foundation | CO 2 | **5** |
| b. | Enumerate the steps involved in soil exploration | CO 1 | **5** |
| c. | Describe any 2 laboratory tests for soil investigation | CO 1 | **5** |
| d. | Explain any one NDT technique of soil investigation | CO 1 | **5** |
| **(OR)** | | | | |
| 2. | a. | Design a suitable combined footing for 2 columns of size 50 cm x 50 cm each separated by a center to center distance of 6m. The ends of footing are curtailed at the edge of 2 columns. Allowable soil pressure 200kN/m2 | CO3 | 20 |
| 3. | a. | Compute the SBC of the square footing constructed at a depth of 1m below the ground level to carry a load of 1000kN. The properties of the soil are c = 10kN/m2, ɸ = 35o, ϒdry = 17.6 kN/m3 and ϒsat = 17.6 kN/m3. Groundawater table is at ground level. Also, determine the dimensions of the square footing so that the factor of safety against the bearing capacity failure = 2.5. Assume Nc = 46.12, Nq = 33.33, Nϒ = 48.03. | CO 3 | 7 |
|  | b. | Differentiate the types of foundations with necessary sketches | CO 2 | 8 |
|  | c. | Define General, Local and Punching Shear failures | CO 2 | 5 |
| **(OR)** | | | | |
| 4. | a. | Design a suitable combined footing to support 2 adjoining columns 50cm x 50cm at a distance of 5m center to center and carrying loads of 4mN and 5mN. The lighter column is very near to the property line. Allowable soil pressure is 400kN/m2 | CO 3 | 12 |
|  | b. | Explain different types of Raft Foundations | CO 2 | 8 |
| 5. | a. | Explain negative skin friction. | CO 2 | **5** |
|  | b. | Describe the group action of piles | CO 2 | **5** |
|  | c. | Enumerate the classification of piles according to their materials | CO 2 | **5** |
|  | d. | Write down the precautions to avoid tilts and shifts | CO 2 | **5** |
| **(OR)** | | | | |
| 6. | a. | A concrete pile of 35cm diameter is driven into a medium dense sand having ɸ = 35o, ϒ = 25kN/m3, K = 1, and tanδ= 0.7 for a depth of 8m. Estimate the safe load for a FOS = 3. Take Nq = 60, Dc/B = 13 | CO 3 | 12 |
|  | b. | A pile driven is with a single acting steam hammer of weight 15kN with a free fall of 900mm. In the final set, the average of last 3 blows in 27.5mm. Find the safe load using Engineering News Record Formula. | CO 3 | 8 |
| 7. | a. | Write down the classification of clays. | CO 1 | **5** |
|  | b. | Explain methods of foundations in expansive soils. | CO 2 | **15** |
| **(OR)** | | | | |
| 8. | a. | Explain CNS concept. | CO 2 | 5 |
|  | b. | Enumerate the methods for vibration isolation | CO 2 | 5 |
|  | c. | Sketch the 3 types of Impact – type machines | CO 1 | 10 |
|  | | **Compulsory:** |  |  |
| 9. | a. | Discuss in detail the application areas of reinforced earth with neat sketches | CO 1 | **20** |

**Course Outcome:**

Students at the end of the course will be able to:

CO1: Knowledge about various soil investigation techniques

CO 2: Knowledge about various types of foundations

CO3: Design of various foundations

ALL THE BEST