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 – 2017**

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| **Code :** | **14CE2012** | **Duration :** | **3hrs** |
| **Sub. Name :** | **FOUNDATION ENGINEERING** | **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 standard penetration test. What are the various corrections? What is the importance of the test in geotechnical engineering? | CO1 | 15 |
| b. | Distinguish between disturbed and undisturbed samples. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Define the term site investigation? What are the different purposes for which site investigations are carried out. | CO1 | 10 |
| b. | Describe with the neat sketch, how you will carry out the wash boring method of soil exploration. What are its merits and demerits? | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | How will you plan a sub soil exploration programme? | CO2 | 5 |
| b. | A SPT was conducted in a dense sand deposit at a depth of 22 m, and a value of 48 was observed for N. the density of the sand was 15 kN/m2. What is the value of N, corrected for overburden pressure? | CO2 | 7 |
| c. | Illustrate the conditions where a pile foundation is more suitable than a shallow foundation? | CO3 | 8 |
| (OR) | | | | |  | **(OR)** |
| 4. | a. | A 2m x 2m footing is located at a depth of 1.5m from ground surface in dense sand. The relative shear parameters, cohesion c = 0, angle of internal friction φ = 36°. Determine the ultimate bearing capacity of the soil if,   1. water table is well below the foundation level. 2. water table is at the surface. 3. water table is at the base of footing.   Take the unit weight of soil as 18 kN/m3 and saturated unit weight of soil as 20kN/m3. | CO2 | 12 |
| b. | Describe Skempton’s analysis for bearing capacity of cohesive soil | CO2 | 8 |
|  |  |  |  |  |
| 5. | a. | Differentiate between general shear failure and local shear failure. How the ultimate bearing capacity in local shear failure is determined? | CO2 | 10 |
| b. | Determine the ultimate bearing capacity of a strip footing, 1.25 m wide with its base at a depth of 1.35 m resting on a dry sand stratum. Water table is very deep. {γ = 17.8 kN/m3 , φ = 380 } | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | List out the assumptions in coulomb’s theory? Compare Rankine’s theory and coulomb’s theory. | CO4 | 5 |
| b. | Determine the active earth pressure on a retaining wall of height 6m retaining a leveled backfill. The angle of internal friction of the soil is 28°. In the first 3m from ground level the unit weight of the soil is 16 kN/m3 and for the next 3m, the unit weight of saturated soil is 20kN/m3. Draw the pressure distribution diagram. Calculate the resultant pressure and its position. | CO4 | 15 |
| 7. | a. | A retaining wall 9 m high retains cohesion less soil, with an angle of internal friction 33°. The surface is level with the top of the wall. The unit weight of the top 3 m of the fill is 21 kN/m3 and that of the rest is 27 kN/m3. Find the magnitude and point of application of the resultant active thrust. | CO4 | 10 |
| b. | Define earth pressure at rest. Show the earth pressure distribution on a retaining wall, assuming the soil is dry. | CO4 | 10 |
| (OR) | | | | |
| 8. | a. | Discuss the procedure for proportioning of footings. | CO3 | 5 |
| b. | Design a strip footing which is subjected to a load intensity of 250kN/m2. The load acting on the footing is taken as 150 kN/m.The thickness of the brick wall is 300mm.Use M20 concrete and Fe415 steel. | CO3 | 15 |
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|  | | **Compulsory:** |  |  |
| 9. | a. | Design a square pile group to carry 400 kN in clay with an unconfined compression strength of 120 kN/m2. The piles are 45 cm diameter and 6 m long. Adhesion factor may be taken as 0.6. | CO3 | 10 |
| b. | Discuss the different method for the installation of piles. | CO3 | 10 |

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