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



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

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **18CE3063** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED FOUNDATION ENGINEERING** | **Max. marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Describe the salient features of a good sub soil investigation report. | CO1 | 8 |
| b. | Discuss standard penetration test. What are the various corrections? What is the importance of the test in geotechnical engineering? | CO1 | 8 |
|  |  |  |  |  |
| 2. | a. | Determine the net ultimate bearing capacity of the square footing has 2.0m wide and 2.0m depth for the following cases. Take angle of internal friction = 35°, unit weight of soil = 18kN/m3 and cohesion = 15kN/m2. Use Terzhagi’s and IS method.   1. Water table is at the level of the base of footing 2. Water table rises to the ground surface. | CO2 | 6 |
| b. | A square footing 2 x 2 m is built on a homogeneous bed of sand of unit weight 18 kN/m3 having frictional angle of 36°. The depth of foundation is 1.5m. Calculate the safe load that can be carried out by the footing with a factor of safety of three against shear failure. Use Terzaghi’s theory. Take Nq = 49 and Nr = 54. | CO2 | 6 |
| c. | Differentiate between general shear failure and local shear failure. How the ultimate bearing capacity in local shear failure is determined? | CO2 | 4 |
|  |  |  |  |  |
| 3. | a. | How would you estimate the load carrying capacity of piles in  i) Cohesive soils and ii) Cohesionless Soil. | CO3 | 6 |
| b. | Discuss the different methods for the installations of piles. | CO3 | 6 |
| c. | Describe various types of pile foundations. | CO3 | 4 |
|  |  |  |  |  |
| 4. | a. | Examine the IRC method for the design of well foundation. | CO4 | 8 |
| b. | Briefly explain about the different shapes of wells? Discuss the characteristics of each type. | CO4 | 8 |
|  |  |  |  |  |
| 5. | a. | Give the characteristics of expansive soils. Describe the procedure of their identification. | CO3 | 8 |
| b. | Describe the salient features of under reamed piles. How are their capacities obtained in sand and clay? | CO4 | 8 |
|  |  |  |  |  |
| 6. |  | A trapezoidal footing is to be provided to support two square columns of 30cm and 50cm sides respectively Columns are 5m apart and the safe bearing capacity of the soil is 400kN/m2. The bigger column carries 5000kN and the smaller 3000kN. Design a suitable size of the footing so that it does not extend beyond the faces of the columns. | CO5 | 16 |
|  |  |  |  |  |
| 7. |  | An isolated 450mm diameter reinforced concrete pile in a jetty structure is required to carry a maximum compression load of 510kN and net a uplift load of 200kN. The soil consists of a loose to medium dense saturated sand (average N = 14) extending to a depth of 10m below sea bed followed by dense sand and gravel (average = 40). Determine the required depth of penetration of the pile. Submerged density of dense sand and gravel is 12 kN/m3. Also design the pile section. | CO6 | 16 |
|  | | | | |
| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | Define Cofferdam. Explain the different types of cofferdams and its purpose. | CO5 | 10 |
| b. | Write the step by step procedure of designing cellular cofferdams. | CO5 | 10 |