**18CE603**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | |
| **June, 2022** | **Civil Engineering** | | |
| **Sixth Semester** | **FOUNDATION ENGINEERING** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | List out the different types of soil samples? | CO1 | |  |
|  | b) | What are the different geophysical methods available? | CO1 | |  |
|  | c) | Define earth pressures conditions? | CO1 | |  |
|  | d) | Define factor of safety. | CO2 | |  |
|  | e) | Difference between total stress and effective stress. | CO2 | |  |
|  | f) | What are the different methods used for analysis of finite slope? | CO2 | |  |
|  | g) | Differentiate shallow and deep foundations. | CO3 | |  |
|  | h) | What is the minimum depth of shallow foundation as per IS 6403-1986? | CO3 | |  |
|  | i) | List out the method that reduce differential settlements. | CO3 | |  |
|  | j) | List the different shapes of well foundation. | CO4 | |  |
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| **Unit - I** | | | | | |
| 2. | a) | Explain the standard penetration test with a neat sketch. | CO1 | **5M** | |
|  | b) | Explain briefly method of soil exploration. | CO1 | **5M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | State the assumptions made in Rankine’s theory. Derive an expression for Active and Passive Pressure. | CO1 | **5M** | |
|  | b) | Explain briefly about the design considerations for retaining wall. | CO1 | **5M** | |
| **Unit – II** | | | | | |
| 4. | a) | What are different factors of safety used in the stability of slopes? Derive an expression for the factor safety of an infinite slope in cohesion less dry soil. | CO2 | **5M** | |
|  | b) | An infinite slope is made of clay with following parameters γ t= 18 kN/m3 , ɸ = 28°, C = 25KN/m2, γ`= 9 kN/m3. If the slope has an inclination of 35° and height equal to 12m , determine the stability of the slope when a) the slope is submerged, and b) there is seepage parallel to the slope. | CO2 | **5M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | Explain briefly about Newmark’s Influence Chart and Westergaards equation? | CO2 | **5M** | |
|  | b) | A load of 1000 kN acts as a point load at the surface of a soil mass. Estimate the stress at a point 3 m below and 4 m away from the point of action of the load by Boussinesq’s formula. Compare the value with the result from Westergard’s theory. | CO2 | **5M** | |
| **Unit – III** | | | | | |
| 6. | a) | Explain Terzaghi’s analysis of bearing capacity of soil in general shear failure. Also state the assumptions of Terzaghi’s analysis. | CO3 | **6M** | |
|  | b) | Determine the ultimate bearing capacity of a strip footing 2m wide, base at a depth of 1.5m, resting on a dry sand stratum, neglect effect of the ground water table. Consider γ d= 18.3 kN/m3 , ɸ = 36°, C = 0, γ sat= 19.7 kN/m3. Use Terzaghi theory (Nc =50, Nq = 65 & Nγ = 80). | CO3 | **4M** | |
|  |  | **P.T.O**  **18CE603**  **(OR)** |  |  | |
| 7. | a) | Illustrate the method to estimate the immediate settlements of a foundation on cohessionless soils. | CO3 | **5M** | |
|  | b) | A footing foundation for a water tower carries a load of 15000 kN and is 3.6metres square. It rests on dense sand of 9m thickness overlying a clay layer of 3 meters depth as shown in figure. The clay layer overlies hard rock. Liquid limit of clay is 54%, water content 40.5%, and grain specific gravity is 2.70. The saturated unit weight of dense sand is 18.9kN/m3. Estimate the ultimate settlement due to consolidation of the clay layer, assuming the site to be flooded. | CO3 | **5M** | |
| **Unit – IV** | | | | | |
| 8. | a) | Explain any four methods to determine pile load carrying Capacity. | CO4 | **5M** | |
|  | b) | A pre-cast concrete pile of 30 cm diameter driven into a sand deposit up to a depth of 12 m. The soil was having ϕ= 30o and γ = 21 kN/m3 up to a depth of 10 m. Estimate the safe load, taking a factor of safety of 2.5. Take k = 1 and tan δ = 0.70, Nq= 25. | CO4 | **5M** | |
|  |  | **(OR)** |  |  | |
| 9. | a) | Briefly explain different types of wells with neat sketch. | CO4 | **5M** | |
|  | b) | Discuss the Components of well foundations. | CO4 | **5M** | |

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