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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year II Semester Regular & Supplementary Examinations October-2020
GEO-TECHNICAL ENGINEERING-II
(CIVIL ENGINEERING)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

- 1 a What are the different purposes of conducting soil exploration? **7M**
b Explain how bore hole are advanced in soils with augers. **5M**

OR

- 2 A SPT was conducted at a depth of 2 m in a sand deposit with a unit weight of 20 kN/m³. The water table at this site was at 1 m below ground surface. The N value was observed to be 5. What would the corrected N value be? At this site for the SPT conducted at 15 m below ground surface, the N value observed was 21. What would be the corrected N value? **12M**

UNIT-II

- 3 With the help of a neat sketch show various forces considered for the analysis of a finite slope using Bishop's simplified method. Mention the equation for factor of safety given by this method. **12M**

OR

- 4 A cut 9 m deep is to be made in a clay with a unit weight of 18 kN/m³ and a cohesion of 27kN². A hard stratum exists at a depth of 18 m below the ground surface. Determine from Tylor's charts if a 30° sloe is safe. If a factor of safety of 1.5 is desired, what is a safe angle of slope? **12M**

UNIT-III

- 5 For a retaining wall system, the following data were available; (i) Height of wall = 7 m, (ii) Properties of backfill: Dry density of soil = 16 kN/m³ and angle of internal friction = 35° (iii) Angle of wall friction, $\delta = 20^\circ$ (iv) bac of wall is inclined at 20° to the vertical (positive batter), and (v) backfill surface is sloping at 1:10. Determine the magnitude of all active earth pressure by Culmann's method. **12M**

OR

- 6 A masonry retaining wall is 1.5 m wide at the top, 3.5 m wide at the base 6 m high. It is trapezoidal in section and has a vertical face on the earth side. The backfill is level with top. The nit weight of the fill is 16 kN/m³ for the top 3m and 23 kN/m³ for the rest of the depth. The unit weight of masonry is 23 kN/m³. Determine the total lateral pressure on the wall per meter run and the maximum and minimum pressure intensities of normal pressure at the base. Assuming $\Phi = 30^\circ$ for both grades of soil. **12M**

UNIT-IV

- 7 Compute the safe bearing capacity of a square footing 1.5 m x 1.5 m, located at a depth of 1 m below the ground level in a soil of average density 20 kN/m^3 , $\Phi = 20^\circ$, $N_c = 17.7$, $N_q = 7.4$ and $N_\gamma = 5.0$. Assume a suitable factor of safety and that the water table is very deep. Also compute the reduction in safe bearing capacity of the footing if the water table raises to the ground level. **12M**

OR

- 8 Determine the allowable gross load and net allowable load for a square footing of 2 m side and with a depth of foundation of 1.0 m. Use Terzaghi's theory and assume local shear failure. Take a factor of safety of 3.0. The soil at the site has $\gamma = 18 \text{ kN/m}^3$, $c' = 15 \text{ kN/m}^2$ and $\Phi' = 35^\circ$. **12M**

UNIT-V

- 9 A concrete pile, 30 cm diameter, is driven into a medium dense sand ($\Phi = 35^\circ$, $K = 1.0$, $\gamma = 21 \text{ kN/m}^3$, $\tan(\delta) = 0.70$) for a depth of 8 m. Estimate the safe load, taking a factor of safety of 2.50. What will be safe load for the pile, if the water table raises to 2 m below the ground surface? Take $\gamma_w = 10 \text{ kN/m}^3$. **12M**

OR

- 10 With a neat sketch explain how plate load test is carried out on a test pile. **12M**

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