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

B.Tech III Year II Semester Supplementary Examinations February-2022

GEOTECHNICAL ENGINEERING - II

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

- 1 a Describe the construction of a split spoon sampler. 6M
b Explain how the Static Cone test is conducted. 6M

OR

- 2 a Discuss various methods available for conducting soil exploration. 6M
b Explain how an undisturbed soil sample is extracted using of Shellby tube. 6M

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 Explain in detail how the stability of an earth dam is tested under different conditions. 6M
b A canal is to be excavated through a soil with $c = 15 \text{ kN/m}^2$, $\Phi = 20^\circ$, $e = 0.9$ and $G = 2.67$. The side slope is 1 in 1. The depth of the canal is 6 m. Determine the factor of safety with respect to cohesion when the canal runs full. What will be the factor of safety if the canal is rapidly emptied? 6M

UNIT-III

- 5 Give the sequence of steps adopted for determining active earth pressure using Rebhann's graphical method with a neat sketch. 12M

OR

- 6 A cantilever retaining wall of 7 m height retains sand. The properties of sand are $e = 0.5$, $\Phi = 30^\circ$ and $G = 2.7$. Using Rankine's theory determine the active earth pressure at the base when the backfill is dry (ii) saturated and (iii) submerged, and also the resultant active force in each case. In addition, determine the total water pressure under the submerged condition. 12M

UNIT-IV

- 7 a Elaborate on various points to be considered while fixing the depth of foundation. 6M
b A circular foundation is of 2.4 m diameter. If the depth of foundation is 1 m, determine the net allowable load. Take $\gamma = 19 \text{ kN/m}^3$, $c = 30 \text{ kN/m}^2$, $\Phi = 15^\circ$ and factor of safety as 3.0. use Terzaghi's equation and assume local shear failure. $N_c = 9.7$, $N_q = 2.7$ and $N_\gamma = 0.9$. 6M

OR

- 8 Describe how the plate load test is conducted with a neat sketch. 12M

UNIT-V

- 9 a Explain in detail under what circumstances pile foundations becomes necessary. 6M
b A wooden pile is being driven with a drop hammer weighing 20 kN and having a free fall of 1.0 m. The penetration in the last 5 blows is 5 mm. Determine the load carrying capacity of the pile according to the Engineering News Record Formula. 6M

OR

- 10 a** Classify the piles based on its intended function with neat sketches. **6M**
- b** A group of 16 piles of 50 cm diameter is arranged with a centre to centre spacing of 1.0 m. The piles are 9 m long and are embedded in soft clay with cohesion 30 kN/m². Bearing resistance may be neglected for the piles. Adhesion factor is 0.6. Determine the ultimate load capacity of the pile group. **6M**

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