T.E.\ Civil\ Sem-VI\ /R-19/ 'c' Scheme)/Sub:- GE-II /S.H.2024

Date:- 10/12/2024

Time: 3 hrs

Marks: 80

Q.P. Code:- 10069497

Note:

1. **No.1 is compulsory**
2. **Solve any 3 questions out of remaining 5 questions.**
3. **Draw neat sketches wherever required**
4. **Assume suitable data wherever necessary**

Q.1 Attempt the following   (5*4=20 Marks)

a) Enlist the Assumption made in Terzaghi one dimensional consolidation theory.
b) Explain i) Active ii) Passive iii) At rest condition in the earth pressure against retaining wall.
c) List out the assumption made by Terzaghi bearing Capacity Theory.
d) State and explain different factor of safety used in stability analysis of slopes.

Q.2a) A cut has to be made 12 m deep inclined at an angle of 35^0 to the horizontal. A possible circular failure surface has radius 20.2m and is passing through the toe of the cut slope and through a point 4m away on the top ground from the edge of the cut, whose center of gravity of the failure mass is at a distance of 9.4 m from the center of failure circle. The properties of soil are $C = 30$ KN/m^2, $\phi=15^0$, $\Upsilon = 20$ KN/m^3. Determine Factor of Safety that would be available on the said failure surface for the cut. Use Friction Circle Method.   **10M**

Q.2b) Following result were obtained from consolidated un-drained test (CU) on normally consolidated clay. Plot strength envelope in terms of effective stress and determine shear strength parameter.   **10M**

Cell pressure in KN/m^2	Deviator Stress in KN/ m^2	Pore Pressure in KN/ m^2
250	150	120
500	300	250
750	455	350

Q.3a) A group of 9 piles arranged in square pattern with diameter and length of each pile as 35cm and 8m respectively is used as foundation in soft clay. Take C=60 KN/m^2 and pile spacing is 120 cm center to center. Find the load capacity of the group Assume Bearing Capacity Factor $N_c = 9$, α =0.75 and FOS=2.5   **10M**

Q.3b) Explain Spring Analog for Terzaghi Primary Consolidation of Soil.   **10M**

Q.4a) A 3m wide Strip footing is located in dense sand at a depth of 2m determine a) Ultimate Bearing Pressure. B) Net Ultimate Bearing Pressure. C) Net Safe Bearing Pressure D) Safe bearing pressure

For The following case
1) Without water Table
2) Water table at the ground surface.

Take Unit weight of soils 18 KN/m³, Saturated unit weight 20 KN/m³, Nc=37.2, Nq=22.5 and Nγ =19.7 use Terzaghi Equation. **10M**

Q.4b) Explain Types of Pile foundation on the basis of Functions, Materials and Composition. **10M**

Q.5a) A retaining wall 6.5m high Retains sand with angle of internal friction is 30^0 and unit weight of 22 KN/m³ up to depth of 4 m from top, from 4m to 6.5m the material is cohesive soil with cohesion is 20 KN/m² and angle of internal friction 20^0 and unit weight of cohesive soil is 18 KN/m³. A uniform Surcharge of 100 KN/m² acts on top of soil. Determine the total active thrust on the wall and point of application. **10M**

Q.5b) Derive the relationship between σ_1, σ_3, C and ϕ. **10M**

Q.6a) Write a short note on types of slope failure. **05M**

Q.6b) Explain Factor affecting Bearing Capacity of soil. **05M**

Q.6c) Discuss the merit and demerit in direct shear test and Triaxial test. **05M**

Q.6d) A Retaining wall 4 m high with vertical back support cohesive soil, backfill having unit weight 20 KN/m³ and angle of internal friction as zero Calculate i) Depth of Tension Crack. ii) Maximum possible unsupported depth of excavation. iii) Active thrust on the wall and point of application **05M**

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