PVP 14

Code: CE5T6

III B.Tech - I Semester – Regular/Supplementary Examinations
October 2018

GEOTECHNICAL ENGINEERING - II
(CIVIL ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11x 2 = 22 M

1. a) Discuss the Plate load test. What are its limitations?
   b) Differentiate between active pressure, passive pressure and at-rest pressure. Give examples of structures, two for each of the cases.
   c) What should be the value of area ratio, inside clearance and the outside clearance of a sampler for minimum sample disturbance?
   d) Mention different types of retaining walls?
   e) How would you determine the critical height of an infinite slope in cohesive soils? List down the different methods for slope stability analysis.
   f) Write down the cases, when you would prefer raft footing over other types of shallow foundations.
   g) Define ultimate bearing capacity, net ultimate bearing capacity and net allowable bearing pressure.

h) Discuss various components of foundation settlements which can occur under loads. Discuss briefly, the methods to compute the same for Cohesive (c-Φ) soils.

i) What are the methods to reduce the differential settlements?

j) A 0.5m diameter pile is bored 10m into a homogeneous consolidated clay deposit. Calculate the safe load if the factor of safety is 3.0. Take C_u= 20 kPa, α = 0.8 and N_c=9.

k) What are different forces acting on the well foundation?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) Discuss Standard Penetration Test? What are the various corrections? What is the importance of the test in geotechnical engineering? 8 M

b) Derive an expression for active earth pressure in cohesive soil, when the ground surface is horizontal. 8 M

3. a) Explain briefly design considerations for retaining wall? 8 M

b) What are different factors of safety used in the stability of slopes? Derive an expression for the factor safety of an infinite slope in a cohesionless dry soil. 8 M

4. a) A circular footing of 2.5m diameter carries a gross load of 2000 kN. The supporting soil is clayey sand (c = 4kPa, $\phi=30^0$ and $\gamma=19kN/m^3$). Determine the depth at which the footing should be located to provide a factor of safety of 3. Use Terzaghi's theory. $N_c=37.2$, $N_q=22.5$ and $N_\gamma=19.7$ for $\phi=30^0$. 8 M

b) How is the ultimate bearing capacity of strip footing changed when water table is (i) above the base of footing (ii) below the base of footing? Derive the expressions. 8 M

5. a) Discuss the various methods for estimation of foundation settlements in different types of soils. 8 M

b) The corrected blow count from SPT in a medium sand, observed at an average depth of 2.5 m was 22 blows/30 cm. Laboratory tests conducted on the sample revealed the following physical properties: $c_¢= 0$, $f_¢= 300$ and $g_t= 18.5$ kN/m^3. The water table was located at 4.5 m from the ground level. It is planned to place a 2 m wide square footing at depth of 2 m. Estimate the allowable gross bearing pressure for the soil if the factor of safety against shear failure is 2.5 and limiting settlement is 25 mm. 8 M

6. a) In a 16 pile group, the pile diameter is 45 cm and centre to centre spacing of the square group is 1.5 m. If c = 15 kN/m^2 , determine whether the failure would occur with

the pile acting individually, or as a group? Neglect bearing at the tip of the pile. All piles are 10 m long. Take m = 0.7 for shear mobilisation around each pile. 8 M

b) In detail explain about sinking of wells. 8 M