PVP 14

Code: CE5T6

III B.Tech - I Semester – Regular/Supplementary Examinations October 2019

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) What is representative soil?
b) Define "inside clearance".
c) What are the types of rotational failure?
d) Define factor of safety for stability of finite slopes.
e) Classify the piles based on material used.
f) What are the types of settlements in shallow foundation?
g) Draw the contact pressure diagrams for both flexible and rigid foundation in granular soil.
h) What is the minimum depth of shallow foundation as per IS 6403-1986?
i) Define significant depth of exploration.
j) Write the Modified Hiley formula for calculating allowable load for piles.

k) If the angle of shearing resistance is 30° and the factor of safety of an infinite slope in sand deposit is 1.732. Calculate the safe inclination of slope under dry condition.

PART – B

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

2. a) Explain the plate load test with a neat sketch. How the bearing capacity of actual footing can be determined from the plate load test data? 8 M

b) A retaining wall with a smooth vertical back is 5 m high and retains a 2-layer sand backfill each having a depth of 2.5 m. For top layer $\phi = 25^0$ and $\gamma = 16 kN/m^3$ and for bottom layer $\phi = 30^0$ and $\gamma = 18 kN/m^3$. Calculate the active thrust acting on retaining wall. 8 M

3. a) Derive an equation for stability of infinite slope in cohesion-less soil under steady seepage condition. 8 M

b) With an aid of neat sketch, explain the stability of retaining walls. 8 M

4. a) Explain in brief about the modes of shear failure under shallow foundations. 8 M

b) A circular footing of size 1.5 m constructed on a soil deposit at a depth of 2 m from the ground surface. The soil is having $\phi = 35^o$ and $\gamma = 19$ kN/m^3. Determine the bearing capacity of soil under circular footing for the following conditions. (For $\phi = 35^o$, $N_c = 29.7$, $N_q = 22.7$, $N_\gamma = 20.9$)

i) When water table is at a depth of 6 m from ground level.

ii) When water table is at a depth of 2.5 m from ground level. 8 M

5. a) Explain how allowable bearing pressure should be calculated based on SPT blow count N. 8 M

b) A square footing of size 3 m x 3 m exerts a pressure of 200 kN/m^2 on a cohesive soil. The Elastic modulus of soil is 5 x 10^4 kN/m^2 and Poisson's ratio is 0.50. Determine the immediate settlement at the centre of the footing by considering

i) The footing is flexible. Take influence factor as 1.12

ii) The footing is rigid. Take influence factor as 0.82 8 M

6. a) 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 $\phi = 30^o$ and $\gamma = 21$ kN/m^3 up to a depth of 10 m. Estimate the safe load, taking a factor of safety of 2.5. Take k = 1 and tan $\delta = 0.70$, $N_q = 25$. 8 M

b) Discuss in briefly about types of well foundation. 8 M