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Paper Id: 100257 Roll No.

B.Tech.
(SEM VI) THEORY EXAMINATION 2018-19
FOUNDATION DESIGN

Time: 3 Hours ***Total Marks: 70***

Note: **1.** Attempt all Sections. If you require any missing data, choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a. Justify the statement "the seismic refraction method is better than the seismic reflection method".

b. Classify the pile according to their mode of transfer of loads.

c. Define negative skin friction.

d. List the different types of shallow foundation settlements

e. Define differential settlement.

f. Discuss in short double reamed pile.

g. State the term Local Shear failure.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. Discuss the different methods used for boring holes. Explain CPT test.

b. A Square footing 1.8 m x 1.8 m is placed over loose sand of density 1.6 g/cm^3 and at depth of 0.8m, the angle of shearing resistance is 30°, N_c= 10.14, N_q= 18.4 and N_γ = 15.1. Calculate the total load that can be carried by the footing.

c. A group of nine piles, 13m long and 250mm in diameter, is to be arranged in a square form in a clay soil with an average unconfined compressive strength of 80 kN/m^2. Work out the Centre to Centre spacing of the piles for a group efficiency factor of 1. Neglect bearing at the tip of the piles.(α = 0.9)

d. Explain the measures for rectification of tilts and shifts in Well foundation.

e. Discuss the properties and use of reinforced soil.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Describe the SPT test. List the corrections used in SPT test and its need.

(b) Describe Site investigation and stages in sub surface exploration.

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4. Attempt any *one* part of the following: 7 x 1 = 7

(a) Explain the different components of settlement of shallow foundations. Write the equation involved in finding immediate settlement of cohesive soils.

(b) A square footing 2 m x 2 m, is founded on a depth of 1.2 m below the surface of a deep stratum of soft saturated clay having unit weight of 19.5 kN/m^3.

The soil has undrained parameters as $\phi_u = 0^o$ and $c_u = 25$ kN/m^3 (, $N_c = 5.7$, $N_q = 1$ and $N_y = 0$) and consolidated undrained parameters (triaxial test) as $\phi' = 22.5^o$ and $c' = 0$ ($N_c = 21.4$, $N_q = 10.1$ and $N_y = 7.3$).

Determine the ultimate bearing capacity of the foundation, (i) immediately after the construction, and (ii) few years after construction.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a) Discuss the Principles of design of Footings.

(b) 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 = 50 kN/m^2, determine whether the failure would occur with 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 mobilized around each pile. Assume data required, if any.

6. Attempt any *one* part of the following: 7 x 1 = 7

(a) Elaborate the different shapes and components of well foundation.

(b) Differentiate between a sheet pile and a retaining wall. List the uses of sheet piles.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a) Discuss the shallow foundation on soil with reinforcement and its design consideration.

(b) Describe elastic models of soil behavior.

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