GANPAT UNIVERSITY
B.TECH SEM VI CIVIL ENGINEERING
REGULAR EXAMINATION APRIL - JUNE - 2016
2CI603 GEOTECHNICAL ENGINEERING - II

Time: 3 Hours

Max Marks: 70

Instructions: - (1) Answer to the two sections must be written in separate answer books.
(2) Figures to the right indicate full marks.
(3) Assume suitable data if required.

SECTION - I

Q1(A) Discuss the effect of water table on the bearing capacity of the soil. (4)

(B) A reinforced concrete pile weighing 30kN is driven by a drop (4) hammer weighing 40 kN and having an effective fall of 0.8m. The average set per blow is 1.4cm. The total temporary elastic compression is 1.8cm. Assuming the co-efficient of restitution as 0.25 and a factor of safety of 2, determine the ultimate bearing capacity and the allowable load for the pile.

(C) Write a short note on efficiency of a pile group. (4)

OR

Q1(A) What is negative skin friction? What is its effect on the pile? (4)

(B) A rectangular footing has a size of 1.8m X 3m has to transmit the (4) load of a column at a depth of 1.5 m. Calculate the safe load which the footing can carry at the factor of safety of 3 against the shear failure. Use IS code method. The soil has following properties: n=40%, w=8 kN/m^2, ø =32.5°. Take Nc =38.13, Nq = 25.85 , Nγ = 35.21.

(C) What are different types of settlement which can occur in a (4) foundation? How are these estimated?

Q2(A) Describe plate load test. What are its limitation and used? (6)

(B) A 16 pile group carries a load of 3000 kN. The length of each pile is (5) 10.5m. The soil is uniform clay to a depth of 20m underlain by rock. Taking B=5m, liquid limit = 60%, γ=16 kN/m^3 and e =1. Compute the settlement of the pile group assuming that the load to be transferred at two – third length of the pile.

OR

Q2(A) A strip footing, 1 m wide at its base is located at a depth of 0.8 m (6) below the ground surface. The properties of the foundation soil are: γ=18 kN/m^3, c = 30 kN/m^2 and ø = 20°. Determine the safe bearing capacity, using a factor of safety of 3. Take Nc =11.8, Nq = 3.9, Nγ = 1.7.

   (a) Use Terzaghi's analysis assuming soils fails by local shear.

   (b) If the water table is located at the base of the footing Assume saturated unit weight of soil as equal to 19.5 kN/m^3.

(B) Describe the pile load test with neat sketch. (5)

Q3(A) A group of 16 piles (4 in each row) was installed in a layered clay (6) soil deposit. The diameter of the pile is 500 mm and their c/c distance is 1 m. The length of the pile group is 18 m. Estimate the safe load capacity of the group with a factor of safety of 2.5. The value of C_u, α and ø from GL to 8m are 25 kPa , 1.0 and 0 respectively and the values of C_u , α and ø from 8m to 24 m are 40 kPa, 0.7 and 0 respectively.

(B) A square footing to be design to carry a load of 500 kN. If the depth (6) of foundation is 1.5m, determine the size of foundation with a factor of safety of 3.0. The water table is at foundation level. Take ø'= 25°, γ=16 kN/m^3, γsat=19 kN/m^3, c'=20kN/m^2. Use Terzaghi's theory. Assume local shear failure. Take Nc =14.8, Nq = 5.6, Nγ = 3.2.

SECTION – II

Q4(A) Write a short note on auger boring. (3)

(B) Write a short note on electrical resistivity method. (4)

(C) Describe the method of replacement of an expansive soil with a good quality soil. (5)

OR

Q4(A) Write a short note on pits and trenches. (3)

(B) Explain the various functions of geotextiles. (4)

(C) What are the common causes of moisture change in soils? (5)

Q5(A) Explain the factors that affect sample disturbances in detail. (6)

(B) What is under reamed pile? How would you install it? (5)

OR

Q5(A) How would you estimate the load carrying capacity of an under reamed pile? (6)

(B) Explain the types of shallow foundations in detail. (5)

Q6(A) Write a short note on piston sampler. (4)

(B) What do you mean by liquefaction of soil? What are the factors affecting it? (4)

(C) How will you stabilize an expansive soil? (4)

END OF PAPER