

Student Exam No:

GANPAT UNIVERSITY
B.TECH SEM VI CIVIL ENGINEERING
REGULAR EXAMINATION MAY/JUNE- 2013
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) What do you mean by Geosynthetics? Explain the use of geotextiles in road works. (6)**
(B) What are the various methods of modification of an expansive soil to improve its characteristics? (6)
- OR**
- Q1(A) What are collapsible soils? What are the preventive measures adopted before construction on collapsible soils? (6)**
(B) Describe in brief various geophysical methods. (6)
- Q2(A) What is expansive soil? What are the effects of swelling on buildings? (6)**
(B) Write down the different steps for selection of the type of foundation. (5)
- OR**
- Q2(A) Describe split spoon samplers with neat sketches. What is its use? (6)**
(B) What is the under reamed pile? How would you estimate the load carrying capacity of the under reamed pile? (5)
- Q3(A) Discuss standard penetration test. What are the various corrections? (6)**
(B) What is liquefaction of soil? Explain in brief the methods used for prevention of liquefaction of soils (6)

SECTION - II

- Q4(A) Define: (a) Gross pressure intensity (b) Ultimate bearing capacity (4)**
(B) Discuss the effect of water table on the bearing capacity of soil. (4)

- (C) A single acting steam hammer weighing 1500 N and falling through a height of 70cm drives a pile to an average penetration of 1cm per blow under the last few blows. Determine the allowable load for the pile using Engineering News Formula. (4)

OR

- Q4(A) Discuss various dynamic formulae. What are their limitations? (4)
(B) What is negative skin friction? What is its effect on the pile? (4)
(C) A strip footing is required to carry a net load of 1000kN at a depth of 1m. Taking factor of safety of 3, determine width of footing. Take $\phi' = 30^\circ, \gamma = 19.5 \text{ kN/m}^3$ and $c = 22 \text{ kN/m}^2$. Use Terzaghi's theory. Assume general shear failure. ($N_c = 37.2, N_q = 22.5, N_\gamma = 19.7$) (4)

- Q5(A) What are different types of settlement which can occur in a foundation? How are these estimated? (5)
(B) An n-pile group has to be proportioned in a uniform pattern in soft clay with equal spacing in all directions. Assuming any values of c determine the optimum value of spacing of piles in the group. Take $n = 30$ and $m = 0.6$. (6)

OR

- Q5(A) How would you estimate the load carrying capacity of a pile in (a) Cohesionless soil (b) Cohesive soil? (5)
(B) Design a friction pile group to carry a load of 3500 kN including the weight of pile cap at a site where the soil is uniform clay to a depth of 20 m underlain by rock. Average unconfined compressive strength of clay is 68 kN/m^2 . The clay may be assumed to be of normally loaded with liquid limit 60% and take factor of safety is 3. (6)

- Q6(A) Describe the pile load test with net sketch for finding the bearing capacity of the soil. (6)
(B) A strip footing 2m wide carries a load intensity of 400 kN/m^2 at a depth of 1.3m in sand. The saturated unit weight of sand is 20 kN/m^3 and unit weight above water table is 17 kN/m^3 . The shear strength parameter are $c = 0$ and $\phi = 35^\circ$. Determine the factor of safety with respect to shear failure of the following cases of location of water table:
(a) Water table is 4m below G.L.
(b) Water table is 0.5m below G.L. ($N_q = 41.4, N_\gamma = 42.4$) (6)

END OF PAPER