

Fifth Semester B.E. Degree Examination, June/July 2018
Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing one full question from each module.

Module-1

- 1 a. What is subsurface exploration? What are objectives of soil exploration? (08 Marks)
b. What are Geophysical methods? Explain seismic refraction method with neat sketch. (08 Marks)

OR

- 2 a. List and explain different types of samplers used in soil sampling. (08 Marks)
b. What are the methods available for dewatering? Explain dewatering by well point system. (08 Marks)

Module-2

- 3 a. Derive the expressions for vertical stress and shear by using Boussinesq's theory. Also write expression for Westergaard's theory. (08 Marks)
b. What is Newmark's influence chart and also describe construction procedure for Newmark's influence chart. (08 Marks)

OR

- 4 a. What are the types of settlement? Explain them with equations. (08 Marks)
b. A soft, normally consolidated clay layer 18 m thick. The natural water content, saturated unit weights specific gravity and liquid limit are 45%, 18 kN/m³, 2.70 and 63% respectively. The vertical stress increment at centre of the layer due to the foundation load is 9 kN/m². The ground water level is at the surface of the clay layer. Determine the settlement of the foundation. (08 Marks)

Module-3

- 5 a. Define with neat sketch At rest, Active and Passive earth pressure. (06 Marks)
b. A retaining wall, 8 m high with a smooth vertical back, retains a clay backfill with $C' = 15 \text{ kN/m}^2$, $\phi' = 15^\circ$ and $\gamma = 18 \text{ kN/m}^3$. Calculate the total active thrust on the wall assuming that tension cracks may develop to the full theoretical depth. (10 Marks)

OR

- 6 a. Explain the causes for slope failure and also list the type of slope failures. (08 Marks)
b. A 7m deep canal has side slope of 1:1. The properties of soil are $C_u = 20 \text{ kN/m}^2$, $\phi_u = 15^\circ$, $e = 0.9$ and $G = 2.75$. If Taylor's stability number is 0.108, determine the factor of safety with respect to cohesion when canal runs full. Also find the factor of safety in case of sudden draw down, if the Taylor's stability number for this condition is 0.137. (08 Marks)

Module-4

- 7 a. Write a note on standard penetration test and its corrections. (08 Marks)
b. Define safe bearing capacity, safe bearing pressure and allowable bearing pressure and also write expressions for the same. (08 Marks)

OR

- 8 a. Discuss the effect of ground water table on bearing capacity of soil. (08 Marks)
b. A square footing $2.5\text{m} \times 2.5\text{m}$ is built on homogenous bed of sand of density 19 kN/m^3 and having an angle of shearing resistance of 36° . The depth of foundation is 1.5m below ground surface. Calculate safe load that can be applied on the footing with factor of safety 3. Take bearing capacity factors as $N_c = 27$, $N_q = 30$ and $N_\gamma = 35$. (08 Marks)

Module-5

- 9 a. Explain the types of piles and also mention their uses. (08 Marks)
b. 200 mm diameter, 8 m long piles are used as foundation for column in a uniform deposit of medium clay ($q_u = 100\text{ kN/m}^2$). The spacing between the piles is 500mm . There are 9 piles in the ground arranged in a square pattern. Calculate the ultimate pile load capacity of the group. Assume adhesion factor = 0.9 . (08 Marks)

OR

- 10 Write short notes on :
- a. Piles in granular soils (04 Marks)
 - b. Settlement of pile group (04 Marks)
 - c. Negative skin friction (04 Marks)
 - d. Pile load tests.