

Fifth Semester B.E. Degree Examination, Dec.2017/Jan.2018
Applied Geotechnical Engineering

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Describe with neat sketch wash boring technique to explore soil. (08 Marks)
b. The following sizes of sampling tubes are available in market.

Sample No.	I	II	III
Outer Diameter (mm)	75	110	50
Inner Diameter	72	107	35
Length (mm)	600	600	600

Out of these which one would you select for obtaining undisturbed Soil sample from a base hole. Apply appropriate technique to get best undisturbed sample. (08 Marks)

OR

- 2 a. Explain with neat sketch, electrical resistivity method of soil exploration. (06 Marks)
b. Predict the Ground water table given the following data: Depth upto which water is boiled out 18 m, Water rise in I day = 0.95 m, II day = 0.86 m and III day = 0.78 m, use the Hvorslev's method for predicting ground water table. (10 Marks)

Module-2

- 3 a. Compare Boussinesq's theory with Westergaard's theory with a logical graph analysis. (08 Marks)
b. Find intensity of vertical pressure at a point 3 m directly below 25 kN point load acting on a horizontal ground surface. What will be the vertical pressure at a point 2 m horizontally away from the axis of loading and at same depth of 3 m? Use Boussinesq's equation. (08 Marks)

OR

- 4 a. Explain components of settlements. (12 Marks)
b. A reinforced concrete foundation of dimensions $1.8\text{m} \times 3.6\text{m}$ exerts a uniform pressure of 180 kN/m^2 on a soil mass, with E-value 45MN/m^2 . Determine the value of Immediate settlement under the foundation. Take $\mu = 0.3$ and $I_f = 1.0$ (04 Marks)

Module-3

- 5 a. Compare Coulomb's Earth pressure theory over Rankin's Earth pressure theory. (06 Marks)
b. Determine the active earth pressure using Rebhann's graphical method. (10 Marks)

OR

- 6 a. Explain the procedure for determination of factor of safety using method of slices for C- ϕ -soil. (12 Marks)
b. An Embankment is inclined at an angle 35° and its height is 15 m. The angle of shearing resistance is 15° and the cohesion intercept is 40 kN/m^2 . The unit weight of soil is 18 kN/m^3 . Examine the factor of safety with respect to cohesion. Consider Taylor's stability number = 0.06. (04 Marks)

Module-4

- 7 a. Determine the bearing capacity of the soil by using plate load test as per IS : 1888 guidelines. (08 Marks)
- b. A square footing located at a depth of 1.3 m below ground has to carry a safe load of 800 kN. Predict the size of footing which is safe against applied load. If the desired factor of safety is 3.0. Assume $c = 0.55$, Degree of Saturation = 50%, $G = 2.67$, $C = 8 \text{ kN/m}^2$. Use Terzaghi's analysis for general shear failure. Assume $\phi = 30^\circ$, $N_c = 37.2$, $N_q = 22.5$ and $N_r = 19.7$ (08 Marks)

OR

- 8 a. Generalize the assumptions made by Terzaghi's bearing capacity theory for development of bearing capacity equation. (08 Marks)
- b. Determine the bearing capacity of the soil by using standard penetration test as per IS : 2131 guidelines. (08 Marks)

Module-5

- 9 a. Classify the various type of Piles based on material and function. (10 Marks)
- b. Explain negative skin friction in pile foundation. (06 Marks)

OR

- 10 a. Explain with a neat sketch the construction and working of under reamed pile. (10 Marks)
- b. Justify with a neat sketch, how static formula summarize the load transfer mechanism in pile foundations. (06 Marks)

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