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10CV64

Sixth Semester B.E. Degree Examination, June/July 2017
Geotechnical Engineering - II

Time: 3 hrs.

Max. Marks:100

**Note: 1. Answer any FIVE full questions, selecting
atleast TWO questions from each part.**
2. Assume missing data suitably.

PART - A

- 1
 - a. What are the objectives of Soil Exploration? (06 Marks)
 - b. List the methods of dewatering techniques used in the field. Explain any one method, with a neat sketch. (06 Marks)
 - c. A sampling tube has inner diameter of 70mm and cutting edge diameter of 68mm. Its outside diameter are 72 mm and 74 mm respectively. Determine area ratio, inside clearance, outside clearance of the sampler. This tube is pushed at the bottom of the borehole to a distance of 550mm with length of sample recorded being 530mm. Find the recovery ratio. (08 Marks)

- 2
 - a. List the assumptions and limitations of Boussinesq's theory of stress in soils. (08 Marks)
 - b. Explain the construction and use of Newmark's chart. (08 Marks)
 - c. A water tank is supported by a ring foundation having outer diameter of 10m and inner diameter of 7.5m. The ring foundation transmit uniform load intensity of 160kN/m². Compute the vertical stress induced at a depth of 4m below the centre of ring foundation using Westergaard's analysis. Take $\mu = 0$. (04 Marks)

- 3
 - a. What are Flow nets? Explain with a neat sketch. List their characteristics. (08 Marks)
 - b. Explain Graphical method of determining phreatic line in homogeneous earthen dam with horizontal drainage filter. (08 Marks)
 - c. For the earthen dam of homogeneous section with horizontal filter, the coefficients of permeability in x & y directions are 8×10^{-7} cm/sec and 3.6×10^{-7} cm/sec respectively. The flow nets constructed gave number of flow channels to be 4 with potential drops 18. Determine the discharge through the dam in m³/day if the head during seepage was 14m. (04 Marks)

- 4
 - a. With a neat sketch, explain different types of earth pressures. (06 Marks)
 - b. Differentiate between Rankine's and Coloumb's theory. (04 Marks)
 - c. A retaining wall of 8m height retains sandy material. The properties of sand are $e = 0.6$, $Q = 30^\circ$ and $G = 2.65$. The water table is at a depth of 2.5m from the ground surface. Draw the earth pressure diagram and determine the magnitude and point of application of the total active earth pressure. (10 Marks)

PART - B

- 5
 - a. With neat sketches, explain types of slope failures and its causes. (08 Marks)
 - b. Explain Friction circle method of stability analysis to slopes. (08 Marks)
 - c. An embankment is inclined at an angle of 35° and its height is 15m. The angle of shearing resistance is 15° and cohesion intercept is 40kN/m². The unit weight of soil is 18kN/m³. Find the factor of safety with respect to cohesion. Consider Taylor's stability number as 0.06. (04 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 6 a. With a neat sketch, explain the effect of eccentric loading on footing. (04 Marks)
b. With a neat sketch, explain plate load test. (06 Marks)
c. Determine the safe bearing capacity of square footing of 2.1m width placed at a depth of 1.5m in a soil with a moist unit weight of 17kN/m^3 , $C = 15\text{kN/m}^2$ and $Q = 30^\circ$. Take $N_c = 11.8$, $N_q = 3.9$ and $N_r = 1.7$. What is the change in bearing capacity if the water table raises to 0.5m above the base of the footing? Assume $F = 3$. (10 Marks)
- 7 a. Explain the terms Immediate settlement, Consolidation settlement, Secondary settlement and Differential settlement. (08 Marks)
b. Estimate the immediate settlement of a footing of size $(2 \times 3)\text{m}$ resting at a depth of 2m in sandy soil whose compression modulus is 10N/mm^2 and the footing is expected to transmit a unit pressure of 160 kN/m^2 . Assume $\mu = 0.28$ and $I_f = 1.06$. (04 Marks)
c. A square footing $(1.2\text{m} \times 1.2\text{m})$ rests on a saturated clay layer of 4m deep. The soil properties are $W_L = 30\%$, $r_{\text{sat}} = 17.8\text{kN/m}^3$, $W = 28\%$ and $G = 2.68$. Determine the primary consolidation settlement if the footing carries a load of 300kN. (08 Marks)
- 8 a. Explain the factors influencing the choice of foundation. (06 Marks)
b. Discuss the proportioning of isolation footing. (06 Marks)
c. Write a note on classification of pile foundation. (08 Marks)
