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10CV64

Sixth Semester B.E. Degree Examination, June/July 2018
Geo - Technical Engineering - II

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1 a. Define Representative and Undisturbed samples. Also explain area ratio with its recommended values. (06 Marks)
b. What are the objectives of soil exploration? List and explain any one indirect method of soil exploration. (08 Marks)
c. Estimate the position of ground water table from the following data obtained from the field. Depth upto which water is boiled out is 10.67m. Rise in water levels :
On first day 64cm , Second day 57.9cm and Third day 51.8cm. (06 Marks)
- 2 a. Write a note on : i) Isobar ii) Contact pressure iii) Newmark's chart. (09 Marks)
b. Differentiate between Boussenesq's and Westergards theory of stresses in soils. (04 Marks)
c. Plot the vertical pressure at a point center 1m, 2m 4m horizontally away from the axis of loading at a depth of 3m, for a point load of 25kN. Use Boussinesq's equation. (07 Marks)
- 3 a. What is Flownet? List the characteristics and use of flownets. (06 Marks)
b. For a homogeneous earthen dam 52m height and 2m free board. The flownet has 22 potential lines and 5 flow channels. Calculate discharge per meter length of dam. The coefficient of permeability in X and Y directions are 8×10^{-5} m/s and 3.6×10^{-5} m/s respectively for earthen embankment. (04 Marks)
c. An earthen dam has the following details. Top width 8m upstream slope 2.75H:1V and downstream slope 2.5 H:1V. Total height of dam 60m. The height of water stored 57.5m. Downstream filter 120m long. K for dam material 4×10^{-7} m/sec. Draw the phonic line and calculate the discharge through the dam. (10 Marks)
- 4 a. List the assumptions made in Rankine's earth pressure theory and explain active earth pressure and passive earth pressure. (06 Marks)
b. Explain Cullman's graphical method of finding out the active earth pressure. (06 Marks)
c. For retaining wall 8m height supports sandy back fill with $e = 0.6$, $G = 2.65$, $\phi = 30^\circ$. Water table is at a depth of 2m from ground surface. Draw active earth pressure diagram and find magnitude and point of application of total earth pressure. Assume soil above water table has a degree of saturation of 50%. (08 Marks)

PART - B

- 5 a. Define Finite Slope. What are the causes for failure of slopes? List various types of failure of slopes with sketches. (06 Marks)
b. Explain the method of slice to determine the factor of safety against failure of finite slope. (08 Marks)
c. An embankment is to be constructed with $C = 20\text{kN/m}^2$, $\phi = 20^\circ$, $\gamma = 18\text{kN/m}^3$, $F_s = 1.25$ and $H = 10\text{m}$. Estimate side slope required. Taylor's stability numbers are as follows for the slope number. (06 Marks)

Slope angle	60°	45°	30°	20°
S_n	0.097	0.062	0.025	0.005

Also determine factor of safety if side slope changes to IV : 2H.

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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. Write a note on : i) General shear failure ii) Local shear failure iii) Effect of water table on bearing capacity. (09 Marks)
- b. What are the assumptions made on Terzaghi's theory? Write the expressions for ultimate bearing capacity of strip footing, square and circular footing. (05 Marks)
- c. Compute the safe bearing capacity of a square footing $1.5\text{m} \times 1.5\text{m}$ located at a depth of 1m below the ground level in a sandy soil of average density 20kN/m^3 , $\phi = 20^\circ$, $N_c = 17.7$, $N_q = 7.4$, $\gamma = 5$. Take factor of safety = 3 and that the water table is very deep. Also compute the reduction in safe bearing capacity of the footing if the water table rise to the ground level. (06 Marks)
- 7 a. What is the importance of settlement analysis? List remedial measures to be taken against harmful settlement. (06 Marks)
- b. Estimate the immediate settlement of a footing of size $2 \times 3\text{m}$ resting at a depth of 1.5m in a sandy soil whose compression modulus is 10N/mm^2 . Footing transmits a pressure of 200kN/m^2 . Take $\mu = 0.3$ and influence factor as 1.06. (06 Marks)
- c. A soft normally consolidated clay layer is 18m thick. The natural water content is 45%. The saturated unit weight is 18kN/m^3 ; The grain specific gravity is 2.70 and liquid limit is 63%. The vertical stress increment at the centre of the layer due to the foundation load is 9kN/m^2 . The ground water level is at the surface of the clay layer. Determine the settlement of the foundation. (08 Marks)
- 8 a. What are the different types of foundation? And list the factors influencing the choice of foundation. (08 Marks)
- b. Enumerate the factors influencing the selection of depth of foundation. (06 Marks)
- c. With a neat sketch, explain the types of piles classified based on its function. (06 Marks)