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10CV64

Sixth Semester B.E. Degree Examination, Dec.2018/Jan.2019
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. State the objectives of Soil exploration programme. (06 Marks)

b. List the methods used for controlling ground water during excavation and explain the Electro — Osmosis method. (06 Marks)

c. A Seismic refraction study of an area has given the following data Determine the seismic velocity for the surface layer and under laying layer. Also determine the thickness of upper layer. (08 Marks)

Distance from Impact point to Geo phone (m)	15	30	60	90	120
Time to receive wave (sec)	0.025	0.05	0.10	0.11	0.12

2 a. Explain Equivalent point load method for determining vertical stress at any point within loaded area (06 Marks)

b. Distinguish between Boussinesq's and Westergard's theories of stress d istribution. (06 Marks)

c. Calculate the vertical stresses in the soil 3m below the foundation vertically below the 500kN load and 400kN load columns at 6m apart. (08 Marks)

3 a. State the assumptions made in the derivation of Laplace equation. (06 Marks)

b. What is Phreatic line. Explain the Casagrande's method to locate the phreatic line in a homogenous earth dam with a horizontal filter at toe. (08 Marks)

c. For a homogeneous earthen dam 52m heigh and 2m free board, a flow net constricted with four flow channels and number of potential drops are 25. The dam has a horizontal filter of 40m at its down stream end. Calculate discharge per meter length of darn if the coefficient of permeability of darn material is $3 \times 10^{-}$ cm/second. (06 Marks)

4 a. Distinguish between Coulomb's Earth Pressure theory and Rankine's Earth Pressure theory. (05 Marks)

b. Derive the equations for the earth pressure coefficient K, and Kr by considering backfill with horizontal surface. Use Rankines theory. (05 Marks)

c. A retaining wall 4m high has a smooth vertical back. The back fill has a horizontal surface in level with top of the wall. The unifonn surcharge load of $36kN/m^2$ over the backfill unit weight of the backfill is $18kN/m^3$ and angle of shearing resistance is 30° and cohesion is zero. Determine the magnitude and point of application of active pressure per meter length of the wall. (10 Marks)

PART — B

5 a. State and explain causes and types of failure of slopes. (05 Marks)
b. State and explain different types of slopes and list the assumptions made in slope stability analysis. (05 Marks)
c. Explain Stability of Finite slopes by method of slices. (05 Marks)
d. A 5m deep canal has side slopes of 1:1, the properties of soil are .0 = 20kN/m^2 , = 10° , e = 0.08 and G = 2.8. If Taylor's stability number is 0.108, determine the factor of safety with respect to cohesion when canal runs fall. (05 Marks)

6 a. State the factors influencing bearing capacity of soil. (04 Marks)
b. Distinguish between General shear failure and Local or Punching shear failure. (04 Marks)
c. Explain Plate load test for determining the ultimate bearing capacity of soil with neat sketch. (06 Marks)
d. A foundation 2.0m square is at 1.2m below ground level in sandy soil with a unit weight of 19.2 kN/m^3 above water table and submerged unit weight of 10.1kN/m^3. If C = 0 and = 30°. Find ultimate bearing capacity when i) Water table is much below the base of foundation ii) Water table rises to the base of foundation iii) Water table rises to ground level. Take N_g = 22 and N, = 20. (06 Marks)

7 a. Explain importance and concept of settlement analysis. (06 Marks)
b. State the factors influencing the settlement of foundation soil. (04 Marks)
c. Determine the consolidation settlement for saturated clay 8m thick underlies a proposed new building. The existing overburden pressure at the centre of clay layer is 300 KPa and load due to a new building increases the pressure by 200KPa. The liquid limit of soil is 75%, Water content of soil is 50% and G. = 2.7. (10 Marks)

8 a. State and explain'different types of classification of pile foundation. (06 Marks)
b. State the factors influencing the choice of foundation. (04 Marks)
c. Write short notes on Mat fbundation. (05 Marks)
d. What is combined footing? Explain different types of combined footing. (05 Marks)