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Roll No .....

MVCT/MVCP-302(B)

M.E./M.Tech., III Semester

Examination, December 2017

Advanced Foundation Engineering

(Elective - II)

Time : Three Hours

Maximum Marks: 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.
iii) Assume suitable data if missing.

1. Proportion a strap footing for the following data:
Allowable pressures: 150kN/m^2 for DL+ reduced LL
225kN/m^2 for DL+LL

Loads on columns

	column A	column B
DL	600kN	800kN
LL	400kN	1000kN

Proportion the footing for uniform pressure under DL+ reduced LL. Distance of C/C of Column= 5.4m; Projection beyond column A not to exceed 0.5m.

2. a) Derive the Terzaghi's general equation for computing ultimate bearing capacity of soils below footings.
b) A Strip footing is to be designed to carry a wall load of 1000kN/m at a depth of 0.8m in a gravelly sand foundation soil. The effective shear strength parameters of the foundation soils are C'=0; ϕ=40°. Determine the maximum width of the footing, if a factor of safety of 3 against shear failure is required and assuming that the water table may rise to the foundation level. The unit weight of soil above the water table is 18kN/m^3 and below the water table is 16kN/m^3, and below the water level, the saturated unit weight is 19.81kN/m^3.

3. a) Indicate the circumstances under which the pile foundations are used for building construction. Describe the method of determining the capacity of a pile.
b) A concrete pile, 30cm square and 6m long is subjected to a horizontal load of 5.0kN and a moment of 5kN/m at the ground level. Taking η_h =20N/cm^3, find maximum bending moment and deflection if the head of the pile is considered to be free.

4. Design a friction pile group to carry a load of 4000kN including the weight of the pile cap at a site where the soil is uniform clay to a depth of 20m, underlain by rock. Average unconfined compression strength of the clay is 80kN/m^2. The clay may be assumed to be of normal sensitivity and normally loaded, with liquid limit 60% . A factor of safety of 3 is required against shear failure also compute the settlement of group assuming the load to be transferred at 2/3 length of the pile.

5. Discuss in detail, the stability analysis method of foundation wells, which are heavy enough to rotate about the base.

6. Define and explain the term 'Geosynthetics' and Geotextiles' differentiate between woven and non-woven geotextiles. Also differentiate between geogrids, geoweb and geocomposits.

7. a) State the precautions necessary in the design and construction of upright wall breakwaters to withstand the effects of destructive forces acting on them.
b) Give typical cross-sections of the several standard types of quay walls and explain their constructions.

8. Write short notes on the following :
a) Balla's theory
b) Pile Load test
c) Reinforced Earth technique
d) Elements of bridge substructure.

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