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Printed Pages : 4 **CE – 604**

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0029 Roll No. | | | | | | | | | | |

B. Tech.

(SEM. VI) EXAMINATION, 2006-07

GEOTECHNICAL ENGINEERING - II

Time : 3 Hours] *[Total Marks : **100***

Note : *(1) Attempt **all** questions.*

*(2) All questions carry **equal** marks.*

1 Attempt any **four** of the following: **5×4=20**

a) Write the problems associated with expansive soils. What type of foundation is considered to be the best for multistoreyed buildings on expansive soils? Explain it.

b) How the liquefaction potential is estimated?

c) Write formulae for estimating overburden correction factors as applied to N-values in SPT.

d) Discuss the electrical resistivity method of soil exploration.

e) Define significant depth of exploration. Discuss the various guide rules for deciding it.

f) Write formula for finding settlement of prototype footing on cohesionless soil using plate load test. A 60 cm square bearing plate settles by 15 mm in a plate load test on a cohesionless

soil under an intensity of load of 2 kg/cm^2. Find the settlement of a prototype shallow footing 1 m square under the same intensity of loading.

2 Attempt any **four** of the following : **5×4=20**

a) Explain the method of determining the allowable bearing capacity of a shallow column footing using Terzaghi's bearing capacity equation. What is the effect of water table on the safe bearing capacity ?

b) Explain the practical uses of the results of plate load test.

c) Justify the statement. Design of a foundation is predominantly controlled by the settlement rather than its ultimate bearing capacity.

d) Differentiate between the total settlement and differential settlement. Which one is critical in the design of a foundation?

e) A footing is 4m × 2m in plan, transmits a pressure of 150 kN/m^2 on a cohesive soil having $E=6 \times 10^4$ kN/m^2 and $\mu = 0.50$. Determine the immediate settlement of the footing at the centre, assuming it to be (a) flexible footing (b) rigid footing. Given that $I_f = 1.52$ for flexible footing and 1.20 for rigid footing and rigidity factor = 0.8.

f) Write a short note on Raft (mat) footings.

3 Attempt any **two** of the following : **10×2=20**

a) What is the use of vertical sand drains? Explain their contribution as soil stabilizing techniques.

b) Enumerate various ground improvement techniques. Discuss grouting technique.

c) What is contact pressure? Draw the contact pressure distribution diagram for rigid and flexible footings on cohesion less and cohesive soils. Explain the main parameters and factors affecting the contact pressure distribution.

4 a) Explain clearly the major differences between Rankine's and Coulomb's theories of lateral earth pressures. **10 × 2 = 20**

b) The soil conditions adjacent to a sheet pile wall are as follows:-

for I layer (sand) from the surface. Thickness of layer = 6.0 m, C'=0.0, ϕ' = 38° and unit weight = 18 kN/m^3.

For II layer (saturated clay) from the surface. Thickness = 3.0 m. C' = **10** kN/M^2, ϕ' = 28° and r_{sat} = 20 kN/M^3.Water table is at a depth 6.0 m from the surface. Plot the distribution of active pressure behind the wall while a surcharge of 50 kN/m^2 is carried on the surface behind the wall.

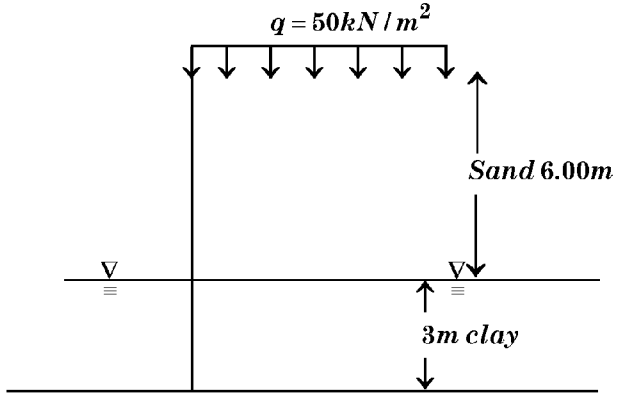

Fig. 1

c) Explain the terms :
   (i) Reinforced earth
   (ii) Counter fort retaining walls and their advantages over the gravity retaining walls.

5 Attempt any **two** of the following : **10×2=20**

a) Discuss the group action of piles on following points :
   (i) Ultimate load capacity of piles in clays and sands
   (ii) Settlement of pile group

b) A 12 m long, 300 mm dia pile is driven in a uniform deposit of sand $(\phi' = 40°)$. The water table is at a great depth and is not likely to rise. The average dry units weight of sand is 18 kN/^{3}. Calculate the safe load carrying of the pile with FOS = 2.5 Adopt $\delta = \frac{1}{4}\phi'$ $K = 2.0$ for dense sand. for $\phi' = 40°$ and $\frac{L}{D} = 40$, $N_q = 137$ (use Berezantzev factor)

c) Draw a sectional view of well foundation. Write the various components of well alongwith their functions. Enumerate the various forces acting on well foundation.