* V - 0 0 5 9 *

Printed Pages : 4　　　　　　　　　　　　　**TCE – 603**

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

PAPER ID : 0059　　**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.*

　　　　　(3)　*In case of numerical problem, assume data, if not provided.*

　　　　　(4)　*Assume should be precise and diagram should be neat and clean*

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

　　(a)　Explain the following terms which are used in subsoil exploration:

　　　　(i)　Area ratio

　　　　(ii)　Recovery ratio

　　　　(iii)　Representative and non representative samples

　　　　(iv)　Undisturbed samples

　　(b)　What are the causes of sample disturbance? How are they taken care of in soil samples for undisturbed sampling?

V-0059]　　　　　　　　**1**　　　　　　　　**[Contd...**

(c) Give guidelines for the number, location and depth of bearings in a subsoil exploration programme

(d) The field N value of SPT test in a deposit of fully submerged fine sand was 35 at a depth of 6 m. The average saturated unit weight of soil is 19kN/m^2. Calculate the corrected N value.

(e) Explain how the boundary between two strata can be estimated by seismic refraction method.

(f) Show various components of Menard pressure meter by a sketch and explain the principle of pressure meter tests.

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

(a) In what respects do the classical theories of earth pressure proposed by Coulomb and Rankines differ. Find Rankine's active earth pressure for a $C - \phi$ backfill with horizontal ground surface.

(b) Explain Culmann's graphical construction for active earth pressure for a inclined wall and sloping ground surface.

(c) A 4 m high smooth vertical wall retains a mass of dry loose sand. Compute the total lateral force per meter acting against the wall, if the wall is prevented from yielding. The sand has a 30° angle of internal friction and unit weight of 14.8 kN/m^3. Also estimate the lateral force per meter run of the wall, if sufficient yield of the wall takes place away from the backfill.

V-0059]   2   [Contd...

3. Attempt any **two** parts of the following:

(a) What are the basic design requirement of shallow foundations ? Discuss in brief, principal modes of shear failure for footings in sand.

(b) Discuss how the bearing capacity computations for shallow foundations are affected due to following:

   (i) If soil properties are such that the local failure in shear may take place.

   (ii) The water table is located just below the base of proposed foundation.

   (iii) The applied load does not coincide with centroid of the footing.

(c) A square footing of width 2.5 m proposed in medium dense sand at a depth of 2.5 m from the ground surface. The sand has a void ratio, $e = 0.72$, specific gravity of soil solids, $G = 2.65$, and the angle of shearing resistance, $\phi = 35^o$. Adopting a factor of safety of 2.5, find the safe load on footing for the following positions of water table (i) at 5 m from ground surface (ii) at 1.5 m from base of footing, and (iii) at 1.2 m from the ground surface. Use bearing capacity equation as per IS 6403 – 1981(2). The bearing capacity factors for $\phi = 35^o$ are as follows: $N_c = 46.12$, $N_q = 33.30$ $N_y = 48.03$.

4. Attempt any **two** parts of the following: **10×2=20**

(a) Discuss the following :

   (i) Block failure for a pile group in clay.

   (ii) Negative skin friction and its effect on pile capacity.

(b) A square group of 25 piles are installed between depth of 2m and 12 m in a deposit of 20 m thick stiff clay overlying rock. The piles are 0.5 m in diameter and are spaced at 1 m centre to centre in the group. The undrained shear strength of clay at the pile base level is 180kN/m^2 and the average value of undrained shear strength over the depth of the pile is 110 kN/m^2. The adhesion factor α is 0.45. Taking factor of safety as 3 against shear failure, find the pile group capacity with consideration to individual and block failure.

(c) Draw a neat sketch of a typical weel foundation showing various components. How is the group length of well foundation determined ?

5. Attempt any **four** parts of the following: 5×4=20
   (a) Give a classification of machine foundations based on the force that they produce.
   (b) Why are special measures required for foundations in black cotton soils ?
   (c) Discuss briefly a few techniques for densifications of non-cohesive soils.
   (d) Discuss in brief some techniques for accelerating consolidation process in saturated cohesive soils.
   (e) What is purpose of soil grouting? Discuss cement grouting in brief.
   (f) What are the objectives of soil stabilization. Mention some stabilisation techniques with brief descriptions.

   ————————