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CE–801

B. E. (Eighth Semester) EXAMINATION, June, 2009

(Civil Engg. Branch)

GEOTECHNICAL ENGINEERING – II

(CE – 801)

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) Describe in brief about the effect of water table on bearing capacity. 8

   (b) Describe the plate load test conducted in field for determination of bearing capacity. 12

2. (a) A strip footing 1·5 m wide at its base is located at a depth of 1 m below the ground surface. The properties of the soil at foundation level are $\gamma = 18\ kN/m^3$, $C = 30\ kN/m^2$, $\phi = 20°$. Determine the safe bearing capacity using a factor of safety of 2·5. Use Terzaghi analysis and assume soil fails by local shear. [Given for $\phi = 20°$, bearing capacity factors $N_{c'} = 11·8$, $N_{q'} = 3·9$, $N_{r'} = 1·7$]. 10

   (b) Write the classification of piles based on the function, materials and composition. 10

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3. (a) Describe the following : 10

(i) Strap footing

(ii) Raft footing

(b) A concrete pile weighing 25 kN (inclusive of helmet and dolly) is driven by a drop hammer weighing 36 kN and having an effective fall of 0·8 m. The average set per blow is 1·2 cm. 10

Total temporary elastic compression is 1·6 cm. Assuming the coefficient of restitution as 0·25 and a factor of safety of 2·5, determine the allowable load carrying capacity for pile.

4. (a) Describe the following : 5 each

(i) Negative skin friction

(ii) Under-reamed pile

(b) In a pile group, determine whether the failure would occur with the pile acting individually or as a group. The square group of pile has 16 Nos. pile, with pile diameter of 40 cm and centre to centre spacing of 1·8 m. Neglect bearing at the top of the pile. All piles are 10 m long. Take $m = 0{\cdot}7$ and $C = 50\ kN/m^2$ for shear mobilization around each pile. 10

5. (a) Describe the various factors affecting the compaction of soil. 10

(b) The following are results of standard compaction test performed on a sample of soil : 10

Water Content (%)	Bulk Density (g/cm^3)
5	1·77
10	1·98
14	2·1
20	2·18
25	2·16

Plot the water content, dry density curve and obtain the optimum water content and maximum dry density. Calculate the water content necessary to completely saturate the sample at its maximum dry density. Assume no change in volume. Take $G = 2 \cdot 7$.

6. (a) What are the different soil stabilization techniques ? Explain the cement stabilization technique in brief. 10

   (b) Describe the commonly used geosynthetics in soil stabilization. 10

7. (a) What are the different methods of soil exploration ? Explain the importance of significant depth. 10

   (b) Describe the following in brief : 5 each

   (i) Characteristics of expansive soils

   (ii) Construction techniques on expansive soil

8. Write short notes on any *four* of the following : 5 each

   (i) Sheet piles

   (ii) Natural frequency

   (iii) Impact type of machine

   (iv) Well foundation

   (v) Assumptions in Terzaghi's theory of bearing capacity

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