No. of Printed Pages : 4

ET-501(B)

B.Tech. Civil (Construction Management) /
B.Tech. Civil (Water Resources Engineering)

00132 **Term-End Examination**

December, 2016

ET-501(B) : FOUNDATION ENGINEERING

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Assume any missing data, if not given. Use of calculator is allowed.*

1. (a) What do you understand by 'Soil Exploration' ? Why is it necessary in Civil Engineering projects ? Mention the limitations of site investigations. 7

(b) How is a soil exploration report prepared ? Explain with a typical bore log sheet. 7

2. (a) Derive the equation suggested by IS-Code for the calculation of Bearing Capacity. 7

(b) How is bearing capacity influenced by the presence of water table ? Explain. 7

3. (a) When are combined footings preferred ? Explain. *7*

(b) Two columns are loaded as shown in Figure 1. Determine the dimensions of combined footing to carry the column loads. *7*

Dimensions of columns

A = 45 cm × 45 cm

B = 50 cm × 50 cm

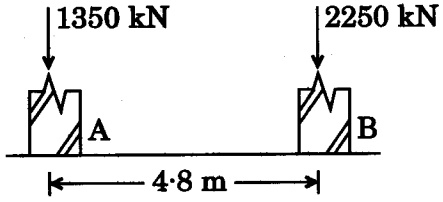

Figure 1

4. A 2 m wide strip footing is to be constructed in a sandy stratum 2 m thick. The depth of footing is 1 m below the ground level. The sand layer is underlain by 1 m thick clay stratum. The clay overlays a bed of dense sand. The water table is at the top of the clay stratum. The submerged unit weight of clay is 8 kN/m^3 and bulk unit weight of clay is 20 kN/m^3. The footing is expected to carry a load intensity of 230 kN/m^2. Compute the ultimate settlement. Assume voids ratio at 44 kN/m^2 = 1·96 and at 195 kN/m^2 = 1·01, respectively.

Given the following data : *14*

Depth	0·1 B	0·5 B	1·0 B	2·0 B
σ_z	0·997 q	0·817 q	0·550 q	0·306 q

5. (a) Explain the state of stress in active and passive states in the backfill behind a retaining wall. 7

(b) Differentiate between counterfort and buttress type of retaining walls. 7

6. A six-pile cluster with 40 cm diameter with centre-to-centre spacing of 105 cm as shown in Figure 2, is driven into a deep deposit of clay. The unconfined compression strength of the clay is 90 kN/m^2. The length of pile is 21 m. Calculate the carrying capacity. *14*

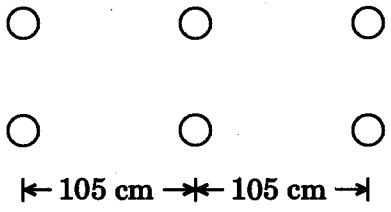

Figure 2

7. Explain the following tests to determine the dynamic soil properties : *2×7=14*

(a) Seismic Cone Penetration Test

(b) Block Resonance Test

8. Write short notes on the following : $4 \times 3\frac{1}{2} = 14$

(a) Construction Techniques in Expansive Soils

(b) Classification of Piles based on Method of Installation

(c) Allowable Bearing Pressure

(d) Reinforced Earth Walls