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BICE-024

01103

DIPLOMA CIVIL ENGINEERING (DCLEVI) / ADVANCED LEVEL CERTIFICATE IN CIVIL ENGINEERING (ACCLEVI)

Term-End Examination

December, 2012

BICE-024 : SOIL MECHANICS AND FOUNDATION ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt* ***any five*** *questions. Question No.1 is* ***compulsory.*** *All questions carry* ***equal*** *marks. Use of* ***scientific*** *calculators allowed.*

7x2=14

1. (a) Ratio of the volume of voids to the total volume of soil mass called its_____ .

(b) The moisture content that gives the maximum dry unit weight is called the _____ .

(c) Relationship between e, w and Sr _____.

(d) Soil is said to be well graded if Cc lies between 1 and _____.

(e) Vibratory roller is used for _____ soils.

(f) _____ is the maximum bearing capacity of soil at which the soil fails by shear.

(g) The property of a porous material which permits the passage or seepage of water through its interconnecting voids is known as _____.

2. (a) Explain phase diagram of the soil. Define water content and Degree of Saturation. 7

(b) Discuss the corrections made to the Hydrometer Readings. 7

3. (a) Define permeability and its importance. Explain the factors affecting the permeability. 7

(b) Define total stress, effective stress and neutral stress. Write the importance of effective stress in engineering problem. 7

4. (a) Write Coulomb's Law. Explain the procedure for determining shear strength of soil. 7

(b) An unconfined cylindrical specimen of clay fails under an axial stress of 240 kN/m^2. The failure plane was inclined at an angle of 55° to the horizontal. Determine the shear strength parameters of the soil. 7

5. (a) Compare the following (i) Compaction and Consolidation (ii) Standard Proctor and modified proctor test. 7

(b) A small cylinder having volume of 600cm^3 is pressed into a recently compacted fill of embankment filling the cylinder. The mass of the soil in the cylinder is 1100g. The dry mass of the soil is 910g. Determine the void ratio and the saturation of the soil. Take the specific gravity of the grains as 2.7. 7

6. (a) What do you mean by soil exploration? List different methods of soil exploration. 7

(b) Discuss the steps of planning of a soil investigation. Explain the Hand operated augers method of in-situ field test of soil? 7

7. (a) Define bearing capacity. List and explain the factors affecting bearing capacity. 7

(b) A strip footing of width 3m is founded at a depth of 2m below the ground surface in a (c-ϕ/) soil having a cohesion C=30kN/m^2 and angle of shearing resistance $\phi = 35°$. The water table is at a depth of 5m below ground level. The moist weight of soil above the water table is 17.25kN/m^3. Determine (a) the ultimate bearing capacity of soil (b) the net bearing capacity, for $\phi = 35°$, Nc=57.8, Nq=41.4 and Nr=42.4. 7

8. Write short note on ***any four*** of the following : **3½x4=14**

(a) Grillage Foundation.

(b) Negative skin friction.

(c) Atterberg Limits.

(d) Efficiency of pile group

(e) Static cone penetration test (CPT)

(f) Constant head permeameter.