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BICE-024

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

00186

Term-End Examination

June, 2015

BICE-024 : SOIL MECHANICS AND FOUNDATION ENGINEERING

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any* ***five*** *questions. Question no.* ***1*** *is* ***compulsory****. Use of scientific calculator is allowed.*

1. Choose the correct alternative from the following : *7×2=14*

(a) The Standard Penetration test is to measure

(i) shear strength of soft clay

(ii) shear strength of sand

(iii) consistency of clay

(iv) None of the above

(b) The best suitable footing to connect an eccentrically loaded column to an interior column is

(i) strap

(ii) combined

(iii) mat

(iv) individual

(c) The active earth pressure coefficient, generally refers to

(i) Effective stress

(ii) Total stress

(iii) Neutral stress

(iv) All the above

(d) Negative skin friction is to be considered when

(i) water table rises

(ii) fill settles relative to pile

(iii) pile settles relative to fill

(iv) both fill and pile settle

(e) The field plate load test, to estimate the allowable bearing pressure, is a short duration test. It helps in predicting

(i) consolidation settlement

(ii) immediate settlement

(iii) both i and ii

(iv) neither i nor ii

(f) Seismic refraction and electrical resistivity method, in reference to soil testing refers to

(i) Geophysical exploration

(ii) Seismic exploration

(iii) Rock core exploration

(iv) None of the above

(g) Which of the following affects the permeability of soil ?

(i) Grain size

(ii) Void ratio

(iii) Adsorbed water

(iv) All the above

2. (a) Give an account of various factors affecting the depth of shallow foundation. *7*

(b) Explain the effect of water table on the bearing capacity of the soil. *7*

3. Define effective stress and neutral stress. Also explain the importance of effective stress of soil in engineering problems. *14*

4. (a) What is meant by seepage velocity ? *4*

(b) A sand sample of 35 cm^2 cross-section area and 20 cm long was tested in a constant head permeameter under a head of 60 cm, the discharge was 120 ml in 6 minutes. The dry weight of sand used was 1120 g and $G_s = 2{\cdot}68$. Find the *10*

(i) Hydraulic conductivity

(ii) Discharge velocity

(iii) Seepage velocity

5. Mention the steps involved in the soil exploration program and explain the influence of soil conditions on the soil exploratory program. *14*

6. (a) Explain Coulomb's law, with a graph plotted between normal pressure and shear strength. *7*

   (b) Make an assessment of advantages and disadvantages of Direct Triaxial Shear tests. *7*

7. (a) Explain the SPT method of determining the ultimate bearing capacity of soil. *7*

   (b) Make a list of factors affecting the bearing capacity of soil. *7*

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

   (a) Ultimate Bearing Capacity
   (b) Soil Permeability
   (c) Factors contributing to Shear Strength of the Soil
   (d) Proctor's Needle
   (e) Plate Load Test
   (f) Triaxial Shear Test