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BICE-012

B.Tech. CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

00656 **June, 2016**

BICE-012 : GEOTECHNICAL ENGINEERING – II

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Assume suitable data, if required. Use of scientific calculator is allowed.*

1. (a) Explain active and passive earth pressures in the design of retaining walls and sheet piles. 7

(b) A retaining wall, 10 m high, retains a cohesionless soil having an angle of internal friction of 30°. The surface of the soil is level with the top of the wall. The top 3 m of the fill has a unit weight of 20 kN/m^3 and that of the rest is 30 kN/m^3. Sketch the earth pressure diagram under active state. 7

2. (a) Why is soil investigation and exploration necessary for a construction project ? *4*

(b) Explain and discuss the various factors that are considered in deciding the number and depth of bore-holes required for subsoil exploration. *10*

3. (a) Discuss vane shear test. *7*

(b) Determine the depth at which a circular footing of 2 m diameter has to be founded to provide a factor of safety of 3 m, if it has to carry a safe load of 2000 kN. The foundation soil has $c = 10\ kN/m^2$, $\phi = 30°$, $\gamma = 18\ kN/m^3$. Use Terzaghi's analysis. $N_c = 37{\cdot}2$, $N_q = 22{\cdot}5$ and $N_\gamma = 19{\cdot}7$. *7*

4. (a) Why do we go for combined or continuous type of foundations, particularly when the structure is on property line ? *7*

(b) Explain the design consideration of open well foundations. *7*

5. (a) Explain different types of settlement and its causes. Explain their limitations. 7

(b) Explain I.S. methods to find the bearing capacity of piles. 7

6. A group of 16 piles of 500 mm diameter is arranged in a square pattern with centre to centre spacing of 1·25 m. The piles are 16 m long and are embeded in soft clay with cohesion of 20 kN/m^2. Bearing resistance may be neglected for piles. Adhesion factor is 0·7. Determine the load carrying capacity of the pile group. 14

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

(a) Soil Samplers

(b) Floating Foundation

(c) Plate Load Test

(d) Rankine's Theory of Earth Pressure

(e) Negative Skin Friction

(f) Stabilization of Soil