Code No: **R41011**   **R10**   **Set No. 1**

IV B.Tech I Semester Supplementary Examinations, February/March, 2018
GEOTECHNICAL ENGINEERING – II
(Civil Engineering)

Time: 3 hours   **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
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1 a) Describe Wash boring method of soil exploration. Also write the advantages and disadvantages of it.   [8]
   b) Discuss the importance of a bore log? Give a typical example showing salient points.   [7]

2 a) Explain the Fellinius method to identify a critical center of rotation for slope stability analysis.   [8]
   b) Discuss in detail the short term and long term stability of slopes and also corresponding shear parameters.   [7]

3 a) Define and describe with strain diagram the following: (i) Active earth pressure, (ii). At rest earth pressure and (iii). Passive earth pressure.   [8]
   b) Estimate the active earth pressure force and its position for the retaining wall system shown in figure 3 (b) below. Water table is located at 2 m depth below the ground surface.
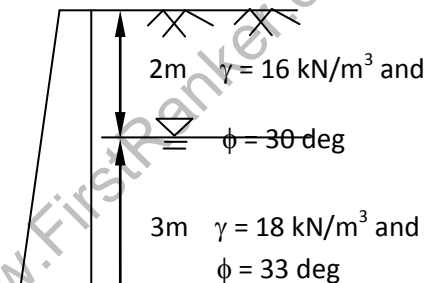
2m $\gamma = 16$ kN/m^3 and
       $\phi = 30$ deg

3m $\gamma = 18$ kN/m^3 and
       $\phi = 33$ deg

Figure 3 (b)   [7]

4 a) What is middle third rule? Discuss the pressure variations beneath the base of retaining wall when load eccentricty passes at: (i) e =0, (ii) e < B/6 and (iii) e > B/6. Where e = load eccentricity from the center of the base and B is the width of base.   [8]
   b) Explain the stability of gravity retaining wall against overturning by showing various force actions on the wall.   [7]

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5 a) Discuss the assumptions of Terzaghi's bearing capacity theory and also comment on it.   [8]

   b) A footing 1.75m × 1.75m is located at a depth of 1.5 m in a clay soil deposit, whose angle of internal friction is zero and cohesion is 125 kPa. Water table is at a depth of 5 m below the ground surface. Determine the net safe bearing capacity for a factor of safety of 3 against shear failure. Use Terzaghi's equation.   [7]

6 a) Write a note on settlements of shallow foundations. Also discuss the typical load settlement behaviour in a plate load test.   [8]

   b) 450 mm square plate settles by 12 mm in a plate load test on a cohesionless soil when the intensity of loading is 225 kPa. What will be the settlement of a prototype shallow footing 1.5 m square under the same intensity of loading?   [7]

7 a) Discuss the influence of spacing of piles on load carrying capacity of pile group.   [8]

   b) A group of 16 piles arranged in square pattern are driven into a clay deposit whose properties are as follows: angle of internal friction = 0, undrained cohesion = 80 kPa and adhesion factor = 0.60. The piles are 450mm in diameter, 10 m long and spaced at 1.2 m center to center. Calculate the capacity of the group neglecting end bearing.   [7]

8   A circular well has an external diameter of 7.5 m and is sunk into a sandy soil to a depth of 20 m below the maximum scour level. The resultant horizontal force is 1800 kN. The well is subjected to a moment of 36,000 kN.m about the maximum scour level due to the lateral force. Determine whether the well is safe against lateral forces, assuming the well to rotate (*a*) about a point above the base, and (*b*) about the base. Assume $\gamma' = 10$ kN/m^3, and $\phi = 36°$. Use Terzaghi's analysis, and a factor of safety of 2 against passive resistance.   [15]