Code: R7410101 **R07**

IV B.Tech I Semester (R07) Supplementary Examinations, May 2012
GEOTECHNICAL ENGINEERING - II
(Civil Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
*****

1. (a) Describe with the help of a neat sketch the wash boring method of subsoil exploration. In what type of soils this method is recommended? What are the limitations of this method?
   (b) What is a bore log? Give a typical example.

2. (a) With a neat sketch explain the 'method of slices' of analyzing the stability of slopes.
   (b) An embankment 10 m high is inclined at 35^0 to the horizontal. A stability analysis by the method of slices gave the following forces. $\sum N$= 900 kN, $\sum T = 420\ kN$, $\sum V = 200\ kN$. If the length of failure is 25.0 m, find the factor of safety. The soil has c = 30 kN/m^2 and Ø = 15^0.

3. (a) Compare Rankine's and Coulomb's theory of earth pressure.
   (b) A wall with a smooth vertical back 9m high supports a purely cohesive soil with c=20 kN/m^2 and $\gamma = 18$ kN/m^3. Determine:-
   (i) Depth of tension crack (ii) Critical depth (iii) Total active thrust per metre run (iv) Total passive thrust and (V) Points of action of active and passive thrusts from the base.

4. (a) Explain how the stability of a gravity retaining wall is checked against:
   (i)Sliding. (ii) Overturning. (iii) Bearing capacity failure.
   (b) A trapezoidal masonry retaining wall 1m wide at top and 3m wide at bottom is 4 m high. The vertical face of the wall is retaining a soil ($\gamma = 18\ kN/m^3$ and Ø = 30^0) at a surcharge angle of 20^0 with the horizontal. Check the stability of retaining wall against sliding, over returning and for 'No tension condition'. The safe bearing capacity of the soil is 100 kN/m^2.

5. (a) What are the assumptions made in the Terzaghi's bearing capacity theory? Sketch the failure mechanism below a strip footing.
   (b) Determine the size of a square footing at the ground level to transmit a load of 900kN in sand weighing 18 kN/m^3 and having an angle of shearing resistance of 36^0 (N γ = 46, Nq = 43). Factor of safety is 3. What will be the modification in the result, if the footing may be placed at a depth of 1m below ground surface? Assume, in this case, the water table may rise to the ground surface. $\gamma = 9$ kN/m^3.

6. (a) Briefly discuss the load-settlement curve from plate load test. State the permissible values for typical soils.
   (b) How allowable bearing pressure is estimated using Teng's formulae? Briefly explain the N-value (SPT value) relationship with ultimate bearing capacity and angle of shearing resistance.

7. (a) Discuss various dynamic pile formulae. What are their limitations?
   (b) A 4 x4 pile group in square pattern consists of 400 mm x 400 mm x 20 m long concrete piles placed at 1.0m centres. The soil profile consists of 8m of soft clay (c=25kPa, adhesion factor = 0.9) underlain by 20 m of medium stiff clay (c=50 kPa, adhesion factor = 0.8). Estimate the safe bearing capacity of the pile group with a factor of safety of 3.0.

8. (a) What are the various components of a well foundation? Discuss them in detail.
   (b) State the problems associated with well sinking and its remedial measures.

*****