Code: 9A01703 **R09**

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2014

GEOTECHNICAL ENGINEERING - II

(Civil Engineering)

Time: 3 hours Max. Marks: 70

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

1 (a) Describe open driven, piston and rotary samplers with sketches.
(b) Describe the plate load and also mention the assumptions.

2 (a) A 6 m high embankment is to be made with a clayey soil having unit weight of 1.75 t/m^3 and cohesion of 3.5 t/m^2. A hard stratum exists at a depth 3 m below ground level. What should be slope angle, if the required factor of safety against sliding is 2.0?
(b) Differentiate the Swedish slip circle method with method of slices.

3 (a) Compare the Rankin's and coulombs theory.
(b) Explain the effect of submergence on active and passive earth pressures.

4 A 4m high retaining wall with a vertical blackface was constructed to retain a backfill of loose sand with a horizontal top surface flushed to the top of the wall. Laboratory investigations revealed that sand had the following properties.
$\emptyset = 25^0$, G = 2.365, e = 1.05, s = 0.
The back of the wall is relatively smooth. Compute the total active earth pressure exerted by the backfill using any suitable theory. A few months after construction, the backfill was thoroughly compacted and consequently, its $\emptyset$-value increased to 32^0. However the top surface of the backfill was depressed by 80 cm. Determine the percent change in the total active earth pressure.

5 (a) Explain the various types of shallow foundations with neat sketches.
(b) Explain the types of shear failure experienced by shallow foundations and mention the parameters to decide type of shear failure.

6 The size of a square footing must be restricted to 1.75 m x 1.75 m. The footing has to carry a net load of 1250 KN coming from the super structure. The foundation soil has the following properties: Density of soil = 1.91 gm/cc, cohesion of soil = 0, angle of internal friction = 36^0. For $\emptyset=36^0$, N_c = 65, N_q = 49, N_r = 54.
Determine the minimum depth at which the footing has to be placed in order to have a factor of safety of 2.0 against shear failure.

7 A pile group consisting of 25 piles arranged in a square formation is to support a raft footing. The length and diameter of each pile are 15 m and 300 mm respectively, while their spacing is 85 cm c/c. The foundation soil is normally consolidated clay having cohesion = 5 t/m^2 and density of soil = 1.85 t/m^3. Determine the safe load bearing capacity of pile group. Take α =0.8 and Fs = 3.0.

8 (a) Describe the various types of shapes of wells and mention the advantages of well foundation.
(b) Explain the Tilt and shift of wells and also give the measures for their correction.

*****