Code: R7410101

R07

B.Tech IV Year I Semester (R07) Supplementary Examinations, May 2013

GEOTECHNICAL ENGINEERING - II

(Civil Engineering)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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1 (a) Discuss various types of soil samples for obtaining undisturbed samples.
(b) Explain the 'seismic refraction method' for sketching the general ground profile at a proposed bridge site.

2 (a) Explain the method of stability analysis for an embankment by slices method.
(b) A vertical cut is to be made in a clayey soil having a unit weight of $18.0\ \mathrm{kN/m^3}$. The cohesive strength of clay $= 40\ \mathrm{kN/m^2}$ and the angle of shearing resistance is zero. What is the maximum height to which the cutting can be excavated with a factor of safety of 2.0?

3 (a) What are the assumptions made in Coulomb's theory of earth pressure?
(b) Describe step by step, Culmann's graphical method for determining active earth pressure.

4 (a) What is retaining wall? Discuss about the various types of retaining walls.
(b) A masonry retaining wall of trapezoidal section with the vertical face on the earth side is 1.5 m wide at the top and 3.5 m wide at the base and is 5.0 m high. It retains a sand fill sloping at 2 horizontal to 1 vertical. The unit weight of sand is $18\ \mathrm{kN/m^3}$ and $\emptyset = 30^\circ$. Find the maximum and minimum pressure at the base of the wall assuming the unit weight of masonry as $23\ \mathrm{kN/m^3}$.

5 (a) Differentiate between different shear failures of soils. How the ultimate bearing of local shear is determined?
(b) A strip footing is required to carry a net load of 1200 kN at a depth of 1 m. Taking a factor of safety of 3, determine the width of the footing. Take $\emptyset = 30^\circ$, $\gamma = 20\ \mathrm{kN/m^3}$, $c = 20\ \mathrm{kN/m^2}$. Use Terzaghi's theory. Assume general shear failure $(N_c = 37, N_q = 22, N_\gamma)$.

6 (a) How is standard penetration test conducted? What are specifications of the test? What corrections are needed to be applied to the standard penetration resistance?
(b) What are the limitations of plate load test? Discuss.

7 (a) Write down brief specifications for conducting pile load test.
(b) A 4X4 group of piles of 300 mm dia and spaced at 0.90 m centre-to-centre, are situated in a saturated clay layer having an average undrained strength of 45 kPa. The piles are 12 m long. The adhesion factor may be taken as 0.9. Determine the safe load for the group of piles can carry, taking into consideration, the individual pile failure as well as the block shear failure criteria into consideration.

8 (a) Enumerate and reflect through sketches the various components of a foundation well. Discuss briefly the function and design of each of these components.
(b) What is the meaning of 'tilt' and 'shift' in relation to well foundation? How would you control them in sinking of wells?

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