Code No: RT32012 **R13** SET - 1

III B. Tech II Semester Supplementary Examinations, November/December-2016

GEOTECHNICAL ENGINEERING – II

(Civil Engineering)

Time: 3 hours Maximum Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1 a) Sketch a split-spoon sampler and explain its parts. [4M]

b) If a uniform surcharge of 120 kN/m^2 is placed on the backfill with $\varphi^1 = 30^0$, find out the increase in pressure. [3M]

c) What are the factors influencing the bearing capacity? [3M]

d) A 2 m wide strip footing rests at a depth of 2 m below the ground surface where water table is at the ground surface. Find the ultimate load which the strip can carry according to Terzaghi's theory when γ_{sat} = 20 kN/m^3 and C = 30 kN/m^2. [4M]

e) Describe the types of pile foundations. [4M]

f) What is tilt and shift in well foundations? [4M]

PART -B

2 a) Describe with a neat sketch how will you carry out the wash boring method of soil exploration. What are its merits and demerits? [8M]

b) Compute the area ratio of a sampler with inside diameter 70 mm and thickness 2 mm. Comment. [8M]

3 A retaining wall is 7 m high, with its back face smooth and vertical. It retains sand with its surface horizontal. Using Rankine's theory, determine active earth pressure at the base when the backfill is (a) dry (b) saturated and (c) submerged, with water table at the surface. Take γ = 18 kN/m^3 and $\varphi = 30^0$, γ_{sat} = 21 kN/m^3. [16M]

4 A circular plate of diameter 1.05 m was placed on a sand surface of unit weight 16.5 kN/m^3 and loaded to failure. The failure load was found to give a pressure of 1,500 kN/m^2. Determine the value of the bearing capacity factor N. The angle of shearing resistance of the sand measured in a triaxial test was found to be 39°. Compare this value with the theoretical value of N. Use Terzaghi's theory of general shear failure. [16M]

5 a) Write brief note on elastic settlements. [8M]

b) Estimate the immediate settlement of a concrete footing 1.5 m x 1.5 m in size founded at a depth of 1 m in silty soil whose modulus of elasticity is 90 kg/cm^2. The footing is expected to transmit a unit pressure of 200 kN/m^2. Assume μ = 0.35, I_f = 0.82 for a rigid footing. [8M]

6 a) Explain the basic difference in the bearing capacity computation of shallow and deep foundations. [8M]

b) A 30 cm square pile, 15 m long, is driven in a deposit of medium dense sand (φ = 36°, $N\gamma$ = 40 and Nq = 42). The unit wt. of sand is 15 kN/m^3. What is the allowable load with a factor of safety of 3? Assume lateral earth pressure coefficient = 0.6. [8M]

7 An open caisson, 19 m deep, has external and internal diameters of 8 m and 6 m, respectively. If the water level is 2 m below the top of the well and the depth of the base below the scour level is 5m, determine the minimum thickness of the seal that will enable complete dewatering of the caisson. Take σ_c = 2000 kN/m^2, γ_c = 24 kN/m^3 and allowable perimeter shear of 650 kN/m . [16M]

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