FACULTY OF ENGINEERING
B.E. 4/4 (Civil) I Semester (Suppl.) Examination, June 2012
FOUNDATION ENGINEERING

Time: 3 Hours]　　　　　　　　　　　　　　　　　　　[Max. Marks: 75

Note : *Answer all questions of Part A. Answer five questions from Part B.*

PART – A　　　　　　　　　　　　　　　　　　(25 Marks)

1. Draw the typical contact pressure distribution of a flexible footing on cohesionless and cohesive soils.　　　2

2. "The settlement recorded in a plate load test include consolidation settlement and hence this test is recommended in sites where settlement governs the bearing capacity". Answer yes or no and justify.　　　2

3. What are "Compaction Piles" ? What are their primary objective ?　　　2

4. "Coffer Dams are permanent structures constructed for irrigation purposes". Answer yes or no and justify.　　　2

5. Name the type of sample if it is collected from a trial pit using a crow bar.　　　2

6. The increment in vertical stress (σ_z) due to a point load applied on the surface at a point (0, 0, 1) was found to be 477.50 kPa. Compute (σ_z) under the same load at a point (2, 2, 2).　　　3

7. In a standard penetration test, the number of shocks recorded for the seating drive/first 150 mm/second 150 mm are 12/21/24. Then determine the N-value.　　　3

8. The load carrying capacity of a friction pile is 500 kN. All other parameters remaining same estimate its load carrying capacity if its diameter is doubled and length is halved.　　　3

9. State the sub-classification of Geo-textiles.　　　3

10. What is "under pinning" ? State various methods of underpinning.　　　3

PART – B
(50 Marks)

11. a) From fundamentals, derive the expression for increment in vertical stress beneath centre of a uniformly loaded circular area of diameter "2a" with a UDL of intensity "q" adopting Boussinesque's theory.

b) A over head service reservoir is provided with a ring type of foundation with outer diameter of 10 m and inner diameter of 6 m transmitting a uniformly distributed load of 4000 kN/sqm. Determine the increment in vertical stress at a point lying 0.50 m beneath the centre of ring foundation.

12. a) Explain the types of shear failures experienced by shallow foundations. Mention the parameters to decide the type of shear failure.

b) A 2 m wide square footing is laid at a depth of 1.20 m below the GL on a c-Φ soil with c = 40 Kpa and $\Phi = 20°$, $\gamma = 17$ kN/cum. Given Nc = 11.80; Nq = 3.90; Nγ = 1.70. Using Terazaghi's theory, compute the ultimate bearing capacity (qf) when the GWT is (i) 5 m below GL (ii) 2 m below GL (iii) at GL. Assume the change in shear parameters due to saturation is negligible.

13. a) A 300 mm diameter RCC pile is installed in a sandy strata to a depth of 10 m. The average properties of the sand are γ = 19.50 kN/cum, Φ = 40°, Nq = 109.41, K = 1.5, $\delta = 2/3 (\varphi)$. Determine its ultimate load carrying capacity, if the critical depth factor is 20.

b) Write a note on "Dynamic formulae" and comment on their validity.

14. a) What is a "Pneumatic Caisson" ? Explain the circumstances in which they are preferred.

b) Describe various methods of soil stabilization including merits and demerits of each.

15. Write a detailed note on methods of dewatering adopted in construction of foundations.

16. a) Explain various methods of "Timbered Excavations" with the help of neat sketches.

b) Write a detailed note on separation function of geotextiles and the related applications.

17. Write a note on **any two** of the following :

a) Proportioning of footings   b) Negative skin friction

c) Geotechnical investigations   d) Plate load test and its limitations.

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