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VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

B.E. (Civil Engg.) III Year II-Semester Advanced Supplementary Examinations, June/July-2017

Geotechnical Engineering

Time: 3 hours Max. Marks: 70

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

1. Sketch the vertical pressure distribution diagram on vertical plane at a distance 'r' from point load 'Q'.
2. Define contact pressure and draw contact pressure diagrams for rigid footings on different soils.
3. Show the zones of plastic equilibrium considered in Terzaghi's analysis. State which of these zones is considered to act as part of footing.
4. Differentiate between local shear and general shear failure.
5. What is the basic principle involved in static formula for bearing capacity determination of piles?
6. What is an under-reamed pile? What is its primary objective?
7. When do we prefer pneumatic caissons?
8. What are the various components of a well foundation?
9. Define area ratio. For good quality of undisturbed sample what should be its value?
10. What is a bore log? Give a typical example.

Part-B (5 × 10 = 50 Marks)
(All bits carry equal marks)

11. a) Write in brief a critical note on Newmark's influence chart.

    b) A circular ring type foundation having an outer diameter of 8m and an inner diameter of 4m is subjected to a uniformly distributed load of 750kN/m^2 all over the surface. Compute the intensity of vertical stress at 2m below the centre of the foundation.

12. a) Discuss standard penetration test and various corrections applied to 'N' values.

    b) A 2m wide square footing is laid at a depth of 1.2m below the ground level on a c-φ soil with c=40kN/m^2, $\varphi = 20^0$ and $\gamma = 17$ kN/m^3 . Given $N_c^1 = 11.80$, $N_q^1 = 3.9$ and $N_\gamma^1 = 1.70$. Using Terazaghi's theory, compute the ultimate bearing capacity (q_u) when the ground water table is (i) 5m below GL (ii) 2m below GL (iii) at GL. Assume the change in shear parameters due to saturation is negligible.

13. a) Provide a detailed classification of piles under different criteria.

    b) A concrete pile, 30cm diameter is driven into a medium dense sand ($\varphi = 35^0$ and $\gamma = 21$ kN/m^3, K=1.0 and tan $\delta = 0.7$) for a depth of 8m. Water table is 2m below ground level. Estimate the safe load carried by the pile taking a factor of safety of 2.5.

14. a) Explain the construction procedure of open caisson with neat sketch.

Contd...2

b) Discuss with neat sketches the cellular coffer dams. What are advantages of circular type cellular coffer dams?

15. a) Explain the need and methods of 'timbering of excavation' for soils with neat sketches.

b) Describe in detail wash boring technique with a neat sketch.

16. a) Explain the different field load tests for determination of bearing capacity of piles.

b) An excavation upto 5m depth was made for a building whose plan dimensions are 60m x 40m.The excavated soil has a unit weight of 19kN/m^2. Find the reduction in vertical stress due to the removal of soil by excavation at a point of 20 m below the original ground level (a) under the center of the building and (b) under a corner of the building. Use Boussinesq's theory.

17. Write short notes on any **two** of the following:

a) Group capacity of piles.

b) Construction of box caissons.

c) Requirement of ground improvement techniques.

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