

**FACULTY OF ENGINEERING**

**B.E. 4/4 (Civil) I-Semester (Supplementary) Examination, June/July 2011**

**FOUNDATION ENGINEERING**

Time : Three Hours]

[Maximum Marks : 75

Answer ALL questions from Part-A.

Answer any FIVE questions from Part-B.

**PART—A (Marks : 25)**

1. Sketch the vertical pressure ( $\sigma_z$ ) distribution on horizontal plane at a depth "Z" below the ground surface, due to a point load "Q".
2. Draw contact pressure diagrams for flexible and rigid footings resting on sand and clay.
3. Explain the ultimate and safe bearing capacities of a foundation.
4. Differentiate between shallow foundation and deep foundation.
5. What is the use of cyclic pile load test ?
6. Mention the Engineering News formula and explain the terms in it.
7. What are the reasons for development of negative skin friction on a pile ?
8. Discuss the conditions under which a pneumatic caisson is used.
9. State the objectives of sub soil exploration.
10. What is Resonance ? What is its significance in design of machine foundations ?

**PART—B (Marks : 50)**

11. (a) Bring out the difference between Boussinesq's and Westergaard's theories of stress distribution.  
(b) Two columns A and B are at 6 m apart. Column A transfers a load of 500 kN and column B, a load of 250 kN. Determine the increment in vertical stress on a horizontal plane 2 m below the ground surface at points vertically below the points A and B.
12. (a) Differentiate between general shear failure and local shear failure.  
(b) Compute the safe bearing capacity of rectangular footing of size 1.2 m  $\times$  1.6 m resting on a homogeneous clay deposit at a depth of 1.2 m below ground level. The shear strength parameters of the soil are  $C = 40 \text{ kN/m}^2$ ,  $\phi = 0$  and average density of soil is  $20 \text{ kN/m}^3$ . Consider FS = 3.0.

13. (a) Describe various dynamic formulae and their limitations.  
(b) A 30 cm diameter concrete pile is driven into homogeneous consolidated clay deposit ( $C_u = 40 \text{ kN/m}^2$ ,  $\alpha = 0.7$ ). If the embedded length is "8 m" estimate the safe load. Consider factor of safety as 3.0.
14. (a) Give a detailed account of classification of piles under different criteria.  
(b) Write a detailed note on pile load tests.
15. (a) Describe a pneumatic caisson with the help of a neat sketch and explain the construction procedure.  
(b) Explain Electro-Osmosis system of dewatering with merits and demerits.
16. (a) Discuss the method of plain pier underpinning.  
(b) Discuss any two types of soil samplers used for obtaining undisturbed samples.
17. Write short notes on :
- (a) Plate load test
  - (b) Correction for construction period applicable to settlement of foundations
  - (c) Cofferdams.