



Code No. : 6365/N

FACULTY OF ENGINEERING
B.E. 4/4 (Civil) I Semester (New) (Suppl.) Examination, June/July 2010
FOUNDATION ENGINEERING

Time: 3 Hours]

[Max. Marks : 75

- Note : 1) Answer all questions of Part A.
2) Answer five questions from Part B.*

PART – A

(25 Marks)

1. “Boussinesque’s theory is more appropriate than Westerguard’s theory in finding stress distribution in layered/stratified soils”. Answer yes/no and justify your answer. 2
2. Describe “REFUSAL” in standard penetration test. 2
3. “Dynamic formulae are applicable only in case of Driven files”. Answer yes or no and justify. 2
4. When do you prefer a ‘pneumatic caisson’ ? 2
5. What is ‘RESONANCE’ ? What is its significance in design of machine foundations ? 2
6. The influence factor of a Newmark’s chart is 0.002. How many radial lines it has if the concentric circles are 20 ? 3
7. Show that, the net ultimate bearing capacity of shallow foundations on Cohesive ($\Phi = 0$) soil is independent of size and depth of the footing. 3
8. The load carrying capacity of an end bearing pile is estimated as 100kN. How the capacity can be doubled for the same length ? 3
9. It is required to construct an earthen embankment with steep slope of 70° (with horizontal) against its stable slope of 35° using geo-synthetic applications. Identify the function and product. 3
10. State objectives of geo-technical investigations. 3

(This paper contains 3 pages)

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PART – B

50

11. a) Comment on validity of Elastic theories such as Boussinesque's theory in computation of (σ_z) in particulate medium like soil.

5

b) A transmission tower is resting on four supports which when joined by imaginary lines forms in to a rectangle (A, B, C, D) of size 12 m \times 8m such that, the 12 m side (BC) is placed normal to the direction of the transmission lines. If wind ward supports (A, B) transmit 5000 kN each and the lea ward supports (C, D) transmit 2000kN each, determine (σ_z).

i) 0.5 m below center of the rectangle

ii) 1 m below wind ward support (A or B).

5

12. a) Explain the effect of Ground Water Table on bearing capacity of shallow foundations.

4

b) Determine total settlement of the foundation, for the conditions given below :

Ground Level (+) 0.00 m

SAND with $\gamma = 18.50$ kN/cum

2 m wide square footing transmitting a contact pressure of 150 kPa

Foundation level

GWT \blacktriangledown (-) 2.00 m

FULLY SATURATED COMPRESSIBLE CLAY

$\gamma_{sat} = 20.00$ KN/cum, LL = 110 %, $e_0 = 1.20$, $\mu = 0.20$, $E_s = 19500$ kPa

$I_w = 1.05$

(-) 5.00 m

Massive sheet rock

Consider dispersion of stress as per 2V to 1H rule. Neglect secondary consolidation settlement.

6

13. a) Determine the safe load carrying capacity of a group of 15 number of 300 mm sized square piles arranged in 3 \times 5 pattern, installed to a depth of 9m in a pure clayey deposit. The properties of the clay include $q_u = 120$ kPa ; $\alpha = 0.68$.

5

b) Explain the phenomena of Negative skin friction and the circumstances in which it is present.

5



14. Write a detailed note on Caisson Foundations. 10
15. a) Explain the functions served by geo-synthetics and associated applications. 5
b) Describe the methods of sampling adopted in geotechnical investigations along with samplers and their quality. 5
16. a) Describe various types of cofferdams along with their merits and demerits and their suitability. 5
b) Explain the applications of grouting in ground improvement. 5
17. Write a note on **any two** of the following :
- a) Standard Penetration test
 - b) Soil Stabilisation
 - c) Underpinning.