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T.E. (Civil) (Part - II) (Semester - VI) Examination, May - 2014
GEOTECHNICAL ENGINEERING - II (Revised) (New)
Sub. Code : 45543

Day and Date : Monday, 19 - 05 - 2014

Total Marks : 100

Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) Q. No. 1 from section - I & Q. No. 5 from section - II are compulsory.
 - 2) Answer any two questions from the remaining in each section.
 - 3) Figures to the right indicate full marks.

SECTION - I

Q1) All questions are compulsory :

[4 × 5 = 20]

- a) What is stability number? Explain its use.
- b) Explain with sketches GSF & LSF.
- c) Explain how to find immediate settlement.
- d) Write about RQD & its significance.

Q2) a) Explain how direction & position of cohesive resistance is found in Friction circle method. [6]

- b) In method of slices, the magnitude of $W \sin\alpha$ for slice numbers 1 to 7 are 2, 1, 0, 2, 3, 4 and 3 respectively, and that of $W \cos\alpha$ for slices 1 to 7 are 2, 3, 5, 4, 5, 2, 1 units respectively. The soil has $C = 0$ & $\phi = 30^\circ$. Determine factor of safety. [9]

Q3) a) Explain how to decide allowable pressure is equal to SBC or less than SBC. [6]

- b) A plate load test was conducted with 30 cm. Square plate at a depth of 1.2 m. below GL, in cohesive soil having $\phi = 0$. The failure was observed at a load of 36 kN. The water table was 4.7m. below GL. Compute cohesion and determine ultimate bearing capacity for strip footing 1m. Wide with its base located 1.2m below GL. $\gamma = 16.8$ kN/m³ with FS = 3, what would be SBC? [9]

P.T.O.

- Q4) a)** Explain Angular distortion & differential settlement. [6]
- b)** A rectangular footing (1m × 1.5m) is placed at a depth of 1m. Below the footing there exists 1.5m. Compressible layer with voids ratio 0.8 and compression index 0.15. Find the expected consolidation settlement if the footing is loaded with 350 kN. Take uniform $\gamma = 18 \text{ kN/m}^3$. Assume load distribution 2V:1H. Consider mid level of compressible layer for analysis. [9]

SECTION - II

- Q5) All questions are compulsory.** [4 × 5 = 20]
- a) Write about the different types of shallow foundation with their suitability.
- b) What are the various causes of negative skin friction? How it can be estimated.
- c) What is cofferdam? What are the advantages of cellular cofferdam?
- d) Explain the vibroflotation method for ground improvement.

- Q6) a)** Write a note on floating foundation. [6]
- b)** Design a trapezoidal combined footing for following data : [9]

Column	Size	Load	Remark
A	0.46 × 0.46 m	2016 kN	Exterior column
B	0.46 × 0.46 m,	1560 kN	Interior column

C/c distance between columns is 5.48m and safe bearing capacity of soil is 190 kN/m².

- Q7) a)** Write a note on under reamed pile. [6]
- b)** A precast concrete pile of size 45 cm × 45 cm is driven into stiff clay. The unconfined compression strength of the clay is 200 kN/m². Determine the length of pile required to carry a safe working load of 400 kN with F.S. = 2.5. Take $\alpha = 0.55, N_c = 9$. [9]

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- Q8) a) Give stepwise procedure for design of anchored sheet pile for cohesionless soil by free earth support method. [6]
- b) Write a note on safety precautions in pneumatic caissons. [5]
- c) Write the advantages of geotextiles. [4]

