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T.Y.B.Tech. (Civil Engineering) (CBCS)(Semester -VI) Examination, November-2023

GEOTECHNICAL ENGINEERING -II

Sub. Code : 81518

Day and Date : Tuesday, 21 - 11 - 2023 **Total Marks : 70**

Time : 02.30 p.m. to 05.00 p.m.

Instructions : 1) ***All questions are compulsory.***

2) ***Figures to the right indicate full marks.***

3) ***Make assumptions wherever necessary and state them clearly.***

4) ***Use of non-programmable calculator is allowed.***

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SECTION - I

Q1) **Answer the following questions :**

a) What are the objectives of soil exploration? **[5]**

b) List the merits and demerits of wash boring. **[6]**

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Q2) **Answer the following questions :**

a) Write assumptions made in Terzaghi's Analysis. **[5]**

OR

a) Explain the effect of water table on bearing capacity of a shallow footing. **[5]**

b) Determine the ultimate bearing capacity of a square footing of 1.5 m size, at a depth of 1.5 m, in pure clay with an unconfined strength of 150 kN/m^2, $\varphi = 0^0$ and γ = 17 kN/m^3. Terzaghi's factors for $\varphi = 0^0$ are Nc = 5.7, Nq = 1 and Nγ = 0. **[7]**

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Q3) **Answer the following questions**

a) What are the circumstances necessitating combined footing? **[5]**

OR

a) Explain the procedure for the design of spread or isolated footings. **[5]**

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b) Estimate the immediate settlement of a concrete footing 1.5 x 1.5 m in size founded at a depth of 1 m in silty soil whose modulus of elasticity is 90 kg/cm^2. The footing is expected to transmit a unit pressure of 200 kN/m^2. Assume μ = 0.35, I_f = 0.82 for a rigid footing. **[7]**

SECTION - II

Q4) **Answer the following questions :**

a) Write the necessity of Pile footing. **[5]**

OR

a) What is group efficiency of pile group? Explain feld's rule. **[5]**

b) A precast concrete pile of size 50 cm x 50 cm is driven into stiff clay. The unconfined compressive strength of the clay is 200 KN/m^2. Determine the length of pile required to carry a safe working load of 400 KN with Fs = 2.5. Take Nc = 9 and α = 0.48. **[7]**

Q5) **Answer the following**

a) Differentiate between the Wells or Open Caissons and Pneumatic Caissons. **[5]**

OR

a) Discuss the common types of coffer dam. **[5]**

b) Name the techniques used in ground improvement and explain any one. **[6]**

Q6) **Answer the following questions**

a) What are the causes of slope failure? **[5]**

b) An embankment 10 m high is inclined at an angle of 36° to the horizontal. A stability analysis by the method of slices gives the following forces per running meter:

Σ Shearing forces = 450 kN, Σ Normal forces = 900 kN & Σ Neutral forces = 216 kN The length of the failure arc is 27 m. Laboratory tests on the soil indicate the effective values c' and φ' as 20 kN/m^2 and 18° respectively.

Determine the factor of safety of the slope with respect to

(a) shearing strength and (b) cohesion. **[7]**