

Code No: RT32012

R13

SET - 1

III B. Tech II Semester Supplementary Examinations, April/May -2019
GEOTECHNICAL ENGINEERING – II
(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

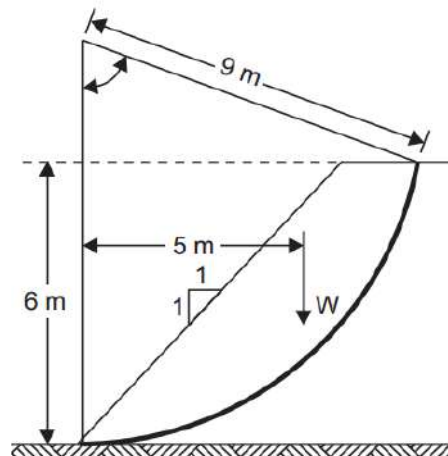
PART -A

- 1 a) Explain an undisturbed sample? [3M]
- b) Write the formula to determine the stability number, and explain the terms in it? [4M]
- c) Based on the geometrical dimensions of a footing, what differentiates between a shallow footing and a deep footing? [3M]
- d) What steps are to be taken to reduce the harmful effects of settlements? [4M]
- e) What is a cyclic pile load test and its purpose? [4M]
- f) Draw the different shapes of well? [4M]

PART -B

- 2 a) Describe with a neat sketch the wash boring method of soil exploration, including its merits and demerits? [10M]
- b) An SPT was performed at a depth of 10m in a fine sand deposit below water-table. The saturated unit weight of the soil is 18kN/m^3 . If the observed N-value is 38, what is the corrected N-value? [6M]

- 3 a) Describe the method of slices to analyse a slope? [11M]
- b) Figure shows the details of an embankment made of cohesive soil with $\phi = 0^\circ$ and $c = 30\text{kN/m}^2$. The unit weight of the soil is 18.90kN/m^3 . Determine the factor of safety against sliding along the trial circle shown. The weight of the sliding mass is 360kN acting at an eccentricity of 5.0m from the centre of rotation. Assume that no tension crack develops. [5M]



- 4 a) Discuss the criteria for deciding the depth of foundations? [8M]
- b) A circular footing is resting on a stiff saturated clay with unconfined compressive strength $= 200\text{kN/m}^2$. The depth of foundation is 2.50m. Determine the diameter of the footing if the column load is 620kN. Assume a factor of safety as 3.0. The bulk unit weight of soil is 22kN/m^3 . [8M]

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- 5 a) Discuss the procedure to determine the safe bearing capacity and settlement from plate load test data? [8M]
b) What is the allowable load for 2.0m square column in a dense sand ($\gamma=20\text{kN/m}^3$ and $\phi=40^\circ$) at a depth of 1.20m, if the settlement is not to exceed 30mm? Factor of safety against shear failure is 3. Water table is at a great depth. [8M]
- 6 a) Write a note on the pile dynamic formulae mentioning their limitations? [8M]
b) A group of 9 piles with 3 piles in a row were driven into soft clay extending from ground level to a great depth. The diameter and length of piles are 30cm and 10m respectively. The unconfined compressive strength of clay is 70kPa. If the piles were spaced at 90cm c/c, compute the allowable load on the pile group on the basis of shear failure criterion for a factor of safety of 2.5. [8M]
- 7 a) Explain sinking of wells? [8M]
b) The subsoil at the typical pier location of a major bridge consists of medium to coarse sand ($N_{\text{corrected}} = 11$) upto a depth of 6m from bed level (RL + 9.20m). This is underlain by 9m thick layer of very stiff to hard sandy silty clay ($N_{\text{corrected}} > 30$), overlying highly weathered rock (RQD= 0). Using Lacey's formula, calculate the maximum scour depth and determine the founding level of the well. The well diameter is 6m. [8M]
