

Roll No

CE-6003 (CBGS)

B.E. VI Semester

Examination, November 2019

Choice Based Grading System (CBGS)

Geotechnical Engineering - I

Time : Three Hours

Maximum Marks : 70

- Note:** i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) A cohesive soil yields a maximum dry density of 1.8 g/cc at an OMC of 16% during a standard proctor test if the values of G is 2.65. Calculate: 7
i) Degree of saturation
ii) Maximum dry density
b) What is the consistency limit? Define the three consistency limit of soil. 7
2. a) What is Compaction? Explain the standard proctor test of compaction. 7
b) Calculate the co-efficient of permeability of a soil sample, 6 cm in height and 50 cm² in cross sectional area, if a quantity of water equal to 430 ml passed down in 10 minutes, under an effective constant head of 40 cm. On oven drying, the test specimen has mass of 498 g. Taking the specific gravity of soil solids as 2.65. Calculate the seepage velocity of water during the test. 7

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3. a) Explain the Mohr Coulomb's theory of shear failure of soils. 7
b) A cylinder of soil fails under an axial vertical stress of 160 kN/m², when it is laterally unconfined. The failure plane makes an angle of 50° with the Horizontal. Calculate the value of cohesion and the angle of internal friction of the soil. 7
4. a) The results of a triaxial shear test are given below-

Specimen No.	1	2
Minor Principal Stress (σ_3) (kN/m ²)	17	44
Major principal stress (σ_1) (kN/m ²)	157	204
Pore pressure (u) (kN/m ²)	12	20

Determine the shear strength parameters using effective stress analysis. http://www.rgpvonline.com 7

- b) Define the terms: 7
i) Quick Sand Condition
ii) Exit Gradient
iii) Phreatic Line
5. a) Explain the Swedish circle method for the analysis of slopes for a $c-\phi$ soil. 7
b) What is meant by stability number? What are different types of slope failures? 7
6. a) What are the index properties of soil? Why are they important? 7
b) State Darcy's law? Define coefficient of permeability of a soil from this law. 7

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7. a) Derive an expression for the effective stress at depth ' z ' in a soil mass when the direction of flow of water through the soil is: 7
- i) Down ward
 - ii) Up ward
- b) Distinguish between normally consolidated soil, under consolidated soil and over consolidated soil. 7
8. Write short notes on : 14
- i) Stokes law and it's limitations
 - ii) UU-Test, CD-Test
 - iii) Sensitivity and Thixotropy
 - iv) Compression Index
