

Roll No

CE-6003 (CBGS)**B.E. VI Semester**

Examination, May 2018

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.

iii) Assume data suitably if any missing.

1. a) Derive the relation between degree of saturation, void ratio, water content and specific gravity of soil particles.
b) What are the significance of consistency limits?
2. A partially saturated sample from a borrow pit has a natural moisture content of 15 percent and bulk unit weight of 1.9g/cc. the specific gravity of solids is 2.70. Determine the degree of saturation and void ratio. What will be the unit weight of the sample on saturation?
3. A sand specimen 40 sq.cm in area and 15cm long was tested in a constant head permeameter under a head of 40cm. Discharge collected in 10 minutes was 200 C.C. Porosity of the sand specimen was 35%. Compute permeability, discharge velocity and seepage velocity.

4. a) What are the assumptions in Coulomb's theory? Compare Rankin's theory and Coulomb's theory of earth pressure.
b) Describe 'Direct Shear Test'. What are its limitations?
5. a) Describe the friction circle method of slope stability analysis.
b) What is difference between stability number and safety factor?
6. a) What is the difference between compaction and consolidation?
b) A normally consolidated clay layer settled by 20mm when the effective stress was increased from 25 to 50 kN/m². What will be its settlement when the effective stress is increased from 50 to 100 kN/m².
7. A retaining wall, 8m high, with a smooth vertical back, retains a clay backfill with $c' = 15 \text{ kN/m}^2$, $\phi' = 15^\circ$, $\gamma = 18 \text{ kN/m}^3$. Calculate the total active thrust on the wall assuming that tension cracks may develop to the full theoretical depth.
8. Write short notes on:
 - a) Tri axial compression test
 - b) Effective stresses
 - c) Reinforced earth retaining wall
 - d) Flow net
