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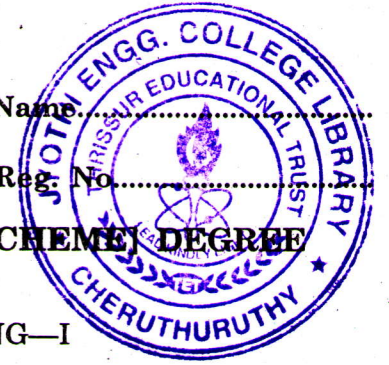
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Name:

Reg. No.

**FIFTH SEMESTER B.TECH. (ENGINEERING) [14 SCHEME] DEGREE
EXAMINATION, NOVEMBER 2016**

CE 14 505—GEOTECHNICAL ENGINEERING—I



Time : Three Hours

Maximum : 100 Marks

Part A

Answer any eight questions.

1. Derive the relationship between e , w , G and s .
2. Draw the plasticity chart for fine grained soils.
3. What are the assumptions made in Darcy's law ?
4. Write down the uses of Flow net.
5. Distinguish between compaction and consolidation.
6. What are the assumptions made in one-dimensional consolidation theory ?
7. Draw the Mohr's circle for fine grained soils.
8. Write down the merits and demerits of triaxial compression test.
9. Briefly explain the nature and functional relationships of soil.
10. Briefly explain laboratory and field identification of soils.

(8 × 5 = 40 marks)

Part B

11. The specific gravity of dry soil is 1.7. When it is allowed to soak up in water, expand and get saturated, its specific gravity increases to 1.82 at a moisture content of 38 %. Determine the specific gravity of solids of the soil and its shrinkage limit.

Or

12. The mass of soil specimen coated with thin layer of paraffin wax is 690.6 g. and the mass of soil alone is 683 g. When the paraffin-coated specimen is immersed in water, it displaces 350 cc of water. The specific gravity of solids of the soil is 2.7 and that of wax is 0.89. Find the void ratio, porosity and degree of saturation if it has got water content of 17 %.

Turn over

13. A soil profile has a surface layer of clay 4 m. thick and density 19.5 kNm^3 and a sand layer of 2 m. thick with a density of 18.5 kN/m^3 lies below the clay layer. Water table is at the ground surface, if a stand pipe is driven into the clay up to the sand layer water level in the stand pipe rises 2 m. above the ground surface. Find the stresses.

Or

14. Water table was found 1.6 m. below ground surface, in the case of deep deposit of very fine sand. Above the water table, the sand was found to be saturated by capillary water. The unit weight of saturated sand was 2.2 t/m^3 . What was the effective vertical pressure on a horizontal plane at a depth of 4.5 m. below the ground surface.
15. (a) Derive the expression for co-efficient of consolidation. (7 marks)
- (b) A 20 cm. thick specimen of clay taken into reach 50 % consolidation in 2 mins, when drained on both sides, when percentage of volume compressibility is 2.5×10^{-2} kg. Calculate coefficient of consolidation and coefficient of permeability.

(8 marks)

Or

16. (a) What are the factors affecting compaction? (5 marks)
- (b) Explain the influence of water content and compactive effect on soils. (10 marks)
17. (a) Explain in detail about direct shear test and mention its merits and demerits. (7 marks)
- (b) A series of shear test were performed on a soil. Each test was carried out until the soil sample sheared. The principal stresses for each test are given below, (i) Draw the Mohr's circle of test : and (ii) Solve it by using $\sigma_1 - \sigma_3$ relationships at failure.

Sl.No.		53 kN/m ² .	5 kN/m ² .
1	...	300	876
2	...	400	1160
3	...	500	1460

(8 marks)

Or

18. (a) Explain in detail the Bishop's method of stability analysis. (10 marks)
- (b) Write a note on slope failure mechanism. (5 marks)

[4 × 15 = 60 marks]