

Reg. No. :

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R 3161

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Fourth Semester

(Regulation 2004)

Civil Engineering

CE 1251 — MECHANICS OF SOIL

(Common to B.E. (Part-Time) Third Semester Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the significance of OMC in proctors compaction test.
2. A dry soil sample weighing 70 gm. Total volume of sample is 40 ml. Specific gravity of soil is 2.60. Find volume of voids and void ratio.
3. Differentiate flocculated and depressive nature of orientation of soil.
4. What do you mean by quick sand condition?
5. Differentiate between compaction and consolidation and what type of soil will under go larger consolidation
6. Find the intensity of vertical pressure at point 5 m directly below the vertical load of 25 KN.
7. Define shear strength of soil state different type of shear failure.
8. For what type of soil vane shear test will be conducted and write the advantages of test?
9. Why we cannot able to use the shear strength parameters in the slope stability analysis?
10. Find the maximum depth in a slope of soil having undrained cohesion is 50 m kN/m², weight of soil is 19 kN/m³. Stability number is 0.20.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Weight of moist soil is 16.5 kN/m^3 , water content is 15% and specific gravity is 2.7. Determine dry density, porosity, degree of saturation and mass of water. (6)
- (ii) Explain the Indian Standard method of classifying fine-grained soils. (10)

Or

- (b) (i) Compare the compaction energy used in IS heavy compaction test with that of light compaction test. (4)
- (ii) What are the various factor influencing compaction behavior of soil. How do you monitor field compaction? (12)
12. (a) For the soil condition shown in fig 2.a. Draw the total, neutral and effective stress diagram up to a depth of 8 m. Neglect the capillary flow. (16)

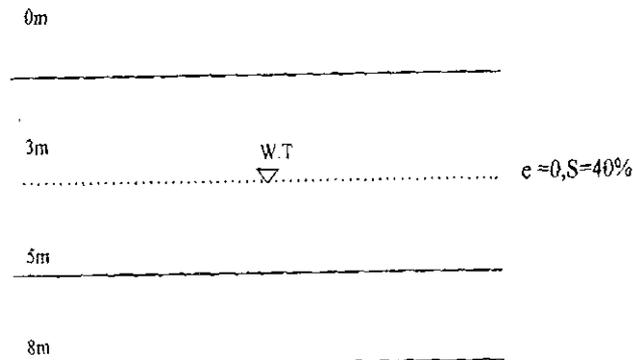


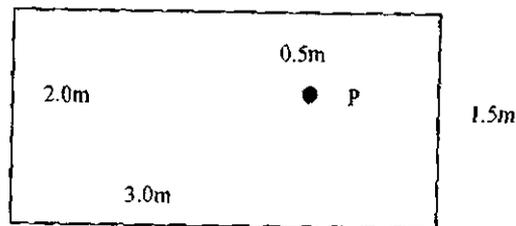
Fig.12 (a)

Or

- (b) How will you find the permeability of clay in laboratory? Explain the procedure to determine the co-efficient of Permeability. (16)
13. (a) A 8 m thick clay layer with single drainage settles by 120 mm in 2 years. The co efficient of consolidation for the clay with found to be $6 \times 10^{-3} \text{ cm}^2/\text{s}$. Calculate the likely ultimate consolidation settlement and find out how long it will take to under go 90% of the settlement. (16)

Or

- (b) A rectangular foundation 3.0×1.5 m causes a uniform load 40 kN/m^2 . Determine the vertical stress at P, which is 3 m below the ground surface. Use equivalent point load method. (16)



14. (a) Derive the Equation for major principal stress using mohr-columb criteria (16)

Or

- (b) (i) In an insitu vane shear test on a saturated clay a torque of 35 N.m was required to shear the soil. The diameter of the vane is 50 mm and length 100 mm calculate the undrained shear strength of clay the vane was than rotated rapidly to cause remolding of soil. The torque applied to shear the soil in the remolded state was 5 N.m . Determine the sensitivity of clay. (8)
- (ii) Explain the deformation of shear strength in Triaxial test. (8)
15. (a) (i) Discuss the different types of slope failure with sketch. (8)
- (ii) Explain the slope stability analysis by method of slices. (8)

Or

- (b) A soil mass underling by rock mass was an infinite slope of shear strength parameter $C = 18 \text{ kN/m}^2$ and $\phi = 25^\circ$.
- (i) If $H = 8 \text{ m}$ and $\beta = 20^\circ$. Find the factor of safety against sliding or rock surface.
- (ii) If $\beta = 30^\circ$ Find the Height H for which factor of safety is 1, Assume pore water pressure is zero..0 (16)