Register Number………………………

B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Fifth Semester

CIVIL ENGINEERING

U07CE505: Mechanics of Soils

Time: Three Hours   **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. Cohesion less soil is

   a) Sand   b) silt   c) clay   d) clay and slit

2. The ratio of the volume of voids to the volume of soil solids in a given soil mass, is known

   a) Porosity   b) specific gravity   c) void ratio   d) water content.

3. The capillary rise of water

  a) Depends upon the force responsible

  b) Increases as the size of the soil particles increases

  c) Decreases as the size of the soil particles decreases

  d) Is less in wet soil than in dry soil

4. Darcy's law is applicable to seepage if a soil is

   a) Homogenous   b) isotropic   c) Incompressible   d) all the above

5. The ration of settlement at any time 't' to the final settlement is known as

   a) Coefficient of consolidation   b) degree of consolidation

   c) Consolidation Index   d) consolidation of undisturbed soil

6. Compression of soil occurs rapidly if voids are filled with

  a) Air   b) water   c) partly with air & partly with water   d) none of these.

7. Ideal pure friction material, such line passes through the origin

  a) Curved line   b) zigzag   c) straight line   d) inclined line

8. Stress path method to determine the relationship between

  a) Stress & path   b) shear & failure

  c) water content & settlement   d) Water content & Effective stress

9. Failure of slopes takes place mainly due to

  a) External force   b) sudden slope   c) action of gravitational force   d) None of the above

10. The method of slices is applicable to

  a) Homogenous soils   b) stratified soils   c) saturated soils   d) non uniform slopes

PART B (10 x 2 = 20 Marks)

11. Differentiate the dry density and saturated density.

12. What is the 'Atterburg limits'?

13. What do you mean by "capillary water of soil"?

14. Briefly explain about quick sand condition.

15. What do you mean by Isobars?

16. Distinguish between compressibility and consolidation.

17. What is shear strength of soil?

18. Write any two advantages of triaxial test.

19. What is angle of friction?

20. Give any example for finite slope and infinite slope.

PART C (5 x 14 = 70 Marks)

21. a) Write the procedure to find the plastic limit and shrinkage limit of soil.

(OR)

   b) A soil sample has a porosity of 40%. The specific gravity of solids is 2.70. Calculate (i) Void ratio, (ii) dry density, (iii) Unit weight if the soil is 50% saturated and (iv) Unit weight if the soil is completely saturated.

22. a) A 10m thick bed of sand is underlined by a layer of clay of 6m thickness. The water table which was originally at the ground surface is lowered by the drainage to a depth of 4m; where upon the degree of saturation above the lowered water table reduces to 20%. Determine the increases in the magnitude of the vertical effective pressure at the middle of the clay layer due to lowering of water table, the saturated unit wt. of sand and clay are respectively 20.6kN/m^3 and 17.6 N/m^3, and dry unit wt. of sand is 16.7 N/m^3.

(OR)

   b) What are the methods available to find the coefficient of permeability and explain the laboratory methods.

23. a) i) A rectangular area 2m x 4m carries a uniform load of 80kN/ m^3 at the ground surface. Find the vertical pressure at 5m below the centre and the corner of loaded area.

   Take K_{B1} = 0.0328(for one quadrant) and K_B = 0.0931

   ii) Mention the assumptions of Boussinesque solution.

(OR)

b) Write the assumptions made in the Terzaghi's theory of one dimensional consolidation.

24. a) Write the essential points of Mohr's coulomb failure theory.

(OR)

b) A cylinder of soil fails under an axial vertical stress of 160kN/m^2 when it is laterally unconfined. The failure plan makes an angle of 50° with the horizontal. Calculate the value of cohesion and the angle of internal friction of the soil.

25. a) Discuss the different types of slope failure with sketch.

(OR)

b) Explain the slope stability analysis by friction circle method.

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