Student Exam No:_____

GANPAT UNIVERSITY

B.Tech. Semester Vth Civil Engineering

Regular Examination November-December-2011

C-503 Geotechnical Engineering-I

Time: 3 Hours **Total Marks: 70**

Instruction:

(1) Answer to the two sections must be written in **separate** answer books.
(2) Figure to the right indicate **full** marks.
(3) Assume suitable data if required.

Section-I

1(A) Write various method for determine of field density. Explain any one in detail. (5)

(B) Discuss the importance of Atterberg's limits in soil engineering. (5)

(C) State Stock's low. (2)

OR

1(A) Define the following term: (5)
(a)Specific gravity (b)Void ratio (c)Porosity (d)Degree of saturation (e)Air content

(B) Discuss various shrinkage parameters. (5)

(C) What is block diagram? (2)

2(A) Write the various method of soil classification and Explain any one in detail. (6)

(B) What is Mohr's strength theory for soil? Sketch the typical envelop for clean sand. (5)

OR

2(A) Compare the AASHTO classification system and Unified soil classification system. (6)

(B) What is Mohr's circle? Discuss its important characteristics. (5)

3(A) A sample of soil was prepared by mixing a quantity of dry soil with 10% by mass of water. Find the mass of this wet mixture required to produce a cylindrical, compacted specimen of 15 cm diameter and 12.5 cm deep and having 6% air content. Find also the void ratio and the dry density of the specimen if G=2.68. (6)

(B) A soil sample consists of particles ranging in size from 0.6 mm to 0.02 mm. The average specific gravity of the particles is 2.66. Determine the time of settlement of the coarsest and finest of these particles through a depth of 1 meter. Assume the viscosity of water as 0.001 N-sec/m^2 and the unit weight as 9.8 kN/m^3. (6)

Section-II

4(A) State Darcy's law and also write a note on validity of Darcy's law. (6)

(B) Define: (i) Coefficient of Consolidation (ii) Compression index (iii) Coefficient of volume change (iv) Coefficient of compressibility (6)

OR

4(A) How would you determine the average permeability of a soil deposit consisting of a number of layers? Explain them in brief. (6)

(B) Briefly explain Initial consolidation, Primary consolidation, and secondary consolidation. (6)

5(A) What are the different factors of safety used in the stability of slopes? (5)

(B) Explain Westgaard's theory for the determination of vertical stress at a point. How is it different from the Boussinesq's solution? (6)

OR

5(A) What do you mean by earth pressure at rest? Derive an equation for determining the magnitude of earth pressure at rest backfill. (5)

(B) Discuss the method for checking the stability of an infinite slope in cohesive soil. What is critical height? (6)

6(A) A sand sample of 35cm^2 cross-sectional area and 20cm long was tested in a constant head permeameter. Under a head of 60cm, the discharge was 120ml, in 6 min. the dry weight of sand used for the test was 1120g, and G =2.68. Determine (a) the coefficient of permeability in cm/sec, (b) the discharge velocity (c) the seepage velocity. (6)

(B) A slope of very large extent of soil with properties c' = 10kN/m^2, ϕ' = 320 is likely to be subjected to seepage parallel to the slope with water level at the surface. Determine the maximum angle of slope for a factor of safety of 1.5 treating it as an infinite slope. For this angle of slope what will be the factor of safety if the water level were to come down well below the surface? The saturated unit weight of soil is 10 kN/m^3. (6)

END OF PAPER