For More Question Papers Visit - www.pediawikiblog.com

CBCS Scheme

USN | | | | | | | | | | |

15CV45

Fourth Semester B.E. Degree Examination, June/July 2017

Basic Geotechnical Engineering

Time: 3 hrs. Max. Marks: 80

Note: 1. Answer FIVE full questions, choosing one full question from each module.
2. Assume missing data, if any, suitably.

Module-1

1 a. With the help of phase diagram of sol, define the terms:
i) Void ratio ii) Water content
iii) Degree of saturation iv) Unit weight of soil **(08 Marks)**

b. Following results were obtained from liquid limit test on a clay sample, whose plastic limit is 13% and natural water content is 18%. Determine the following:
i) Liquid limit ii) Flow index iii) Consistency index

Number of blows	5	16	23	42
Water content %	32	27.8	25.5	23.3

(08 Marks)

OR

2 a. Sketch a typical grain-size curve for (i) Well graded soil, (ii) Uniformly graded soil. Calculate uniformity coefficient and coefficient of curvature from the curve. **(04 Marks)**

b. Explain the salient features of I.S. plasticity chart for classification of fine grained soils. **(06 Marks)**

c. A partially saturated sample from a borrow pit has a natural water content of 14% and bulk unit weight of 19 kN/m^3. The specific gravity of solids is 2.70. Determine the void ratio, and degree of saturation. What will be the unit weight of the sample on saturation? **(06 Marks)**

Module-2

3 a. Distinguish between:
i) Primary and secondary valence bonds
ii) Dispersed and flocculent structures
iii) Structure of Kaolinite and Montmorillonite
iv) Isomorphism substitution and base exchange capacity **(10 Marks)**

b. Differentiate between standard and modified proctor tests. **(06 Marks)**

OR

4 a. Explain the factors affecting the degree of compaction. **(04 Marks)**

b. List the differences between compaction and consolidation. **(04 Marks)**

c. In a standard proctor test. Following results were obtained:

Mass of compacted soil in grams	1700	1890	2003	1960
Water content %	7.7	11.5	14.6	19.7

i) Draw the compaction curve showing OMC and maximum dry density.
ii) Determine the void ratio and degree of saturation.
Given, volume of mould = 950 cc and G = 2.65. **(08 Marks)**

For More Question Papers Visit - www.pediawikiblog.com

For More Question Papers Visit - www.pediawikiblog.com

Module-3

5 a. Define Darcy's law. Derive an expression to relate discharge velocity and seepage velocity. **(06 Marks)**

b. Explain the following terms:
i) Total stress ii) Neutral stress
iii) Effective stress iv) Quick sand condition **(06 Marks)**

c. An earthen dam is built on a impervious foundation with a horizontal filter under the downstream slope. The horizontal and vertical permeability of the soil material in the dam are respectively 4×10^{-5} m/sec and 1×10^{-5} m/sec. Full reservoir level is 20m above downstream filter. Flow net consists of 4 flow channels and 15 equipotential drops. Estimate the seepage loss per meter length of the dam. **(04 Marks)**

OR

6 a. List the properties and use of flow nets. **(04 Marks)**

b. In a falling head permeameter test, the initial head is 300 m it drops by 1 cm in 3 minutes. How much longer should the test to be continued, if the head is to drop to 180 m? **(04 Marks)**

c. Explain with neat sketch the method of locating the phreatic line in a homogenous earth dam with horizontal filter. **(08 Marks)**

Module-4

7 a. Explain mass-spring analogy of consolidation of soils. **(08 Marks)**

b. In a consolidation test, the void ratio of soil sample decreases from 1.20 to 1.10 when the pressure increases from 160 to 320 kN/m^2. Determine the coefficient of consolidation, if the coefficient of permeability is 8×10^{-7} mm/sec. **(08 Marks)**

OR

8 a. Explain under consolidated, normally consolidated and over consolidated soil. **(06 Marks)**

b. How preconsolidation pressure is determined by Casagrande's method? **(06 Marks)**

c. A soil sample 2 cm thickness take 20 minutes to reach 20% consolidation. Find the time for a clay layer 6 cm thick to reach 40% consolidation. Assume double drainage in both cases. **(04 Marks)**

Module-5

9 a. Briefly explain Mohr-Coulomb's shear strength theory. **(06 Marks)**

b. In a direct shear test on sand, sample failed at a shear strength of 70 kN/m^2 when normal stress was 100 kN/m^2. Determine angle of internal friction. Draw Mohr circle at failure. Mark major and minor principal planes. What are the values of major and minor principal stresses? **(10 Marks)**

OR

10 a. Mention the advantages and disadvantages of direct shear test. **(04 Marks)**

b. Classify shear tests based on drainage conditions. **(03 Marks)**

c. A soil has unconfined compression strength of 120 kN/m^2. In triaxial compression test, specimen of same soil (under similar conditions) when subjected to cell pressure of 40 kN/m^2, failed at an additional stress of 160 kN/m^2. Determine:
i) Shear strength parameters
ii) Angle made by failure plane with axial stress direction in case of triaxial test. **(09 Marks)**

* * * * *

For More Question Papers Visit - www.pediawikiblog.com