B.Tech IN CIVIL ENGINEERING (BTCLEVI)

Term-End Examination

June, 2012

BICE-026: GEO-TECHNICAL ENGINEERING - I

01025

Time : 3 hours   Maximum Marks : 70

Note :   (i)   All answers are to be written in English only.
           (ii)   Total answer to be given for seven questions.
           (iii) Non programmable calculators are allowed.

---

1. (a)   Describe void ratio moisture content,   5
          maximum dry density.

    (b)   A sample of dry soil weighs 68 gm. Find the   5
          volume of voids if the total volume of the
          sample is 50 ml and the specific gravity of
          soil is 2.60. Also find the void ratio of soil
          sample.

2. (a)   Give five uses of particle size distribution   5
          curve.

    (b)   A sample of sand has a volume of 1000 ml   5
          in its natural state. Its minimum volume
          when compacted is 840 ml. When gently
          poured in a measuring cylinder, its
          maximum volume is 1370 ml. Determine
          the relative density of sand.

3. (a) Define Darcy's law and its validity. 5

   (b) Describe briefly the factors affecting permeability of soil. 5

4. The falling head permeability test was conducted in laboratory on a soil sample of 50 mm dia and 200mm long. The head fall from 1.00 m to 0.30 m. in the duration of 30 minutes. If the cross sectional area of the stand pipe was 10 mm², Find the co-efficient of permeability. 10

5. (a) Differentate between primary and secondary consolidation. 5

   (b) Describe Terzaghi's theory of consolidation and it's assumption. 5

6. (a) Discuss the following : (*any two*) 2½x2=5
   (i) The Zero air void line.
   (ii) IS Classification of soil
   (iii) Mohr- Coulomb strength theory.

   (b) The factor affecting shear strength of cohesive soils. 5

7. (a) A series of direct shear test was conducted on a soil, each test was carried out till the sample got failed. The following test result was obtained : 6

Sample No	Normal stress (KN/m²)	Shear stress (KN/m²)
1	15	18
2	30	25
3	45	32

   Determine the cohesion intercept and the angle of shearing resistance.

(b) Draw mohr's failure envelope for normally consolidated clay and discuss briefly. **4**

8. What are the different methods of compaction used in the field for soil compaction ? Describe pneumatic -tyred roller for compaction of soil. **10**

9. Describe Swedish circle method for a slop analysis. How most crictical circle is located ? **10**

10. Write short notes (*any two*) : **5+5=10**
   (a) Assumption that are made in analysis of stability of slope.
   (b) Factor affecting compaction of soil.
   (c) Assumption and limitation of Boussinesq's equation.