

**DIPLOMA IN CIVIL ENGINEERING  
DCLEC (G)**

**Term-End Examination  
December, 2012**

**01783**

**BCE-046 : SOIL MECHANICS AND  
FOUNDATION ENGINEERING**

*Time : 2 hours*

*Maximum Marks : 70*

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*Note : Question Number 1 is compulsory. Attempt any four questions more out of question number 2 to 7. All questions carry equal marks.*

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**7x2=14**

1. (a) The specific gravity and water content of a saturated clay mass are 2.60 and 16% respectively. The void ratio will be :
- (i) 0.146                      (ii) 0.416
- (iii) 0.641                     (iv) 0.614
- (b) The particle size analysis of fine grained soil is carried out by :
- (i) Sieve analysis
- (ii) Sedimentation analysis
- (iii) both (i) and (ii)
- (iv) None of the above

- (c) The permeability of fine grained soil can be determined by :
- (i) Constant head permeameter
  - (ii) Falling head permeameter
  - (iii) Consolidation test
  - (iv) Both (ii) and (iii)
- (d) Which roller is most suitable for fine grained soil :
- (i) Smooth wheel roller
  - (ii) Pneumatic type roller
  - (iii) Ordinary roller
  - (iv) Sheep foot roller
- (e) The unconfined compressive strength test can be carried out for following soil :
- (i) Gravel
  - (ii) Sand
  - (iii) Gravel and Sand mixture
  - (iv) Stiff Clay
- (f) In which soil the skin friction will be more as compared to point bearing of a pile foundation :
- (i) Gravel
  - (ii) Sand
  - (iii) Gravel and Sand mixture
  - (iv) Stiff clay





(b) A saturated soil has weight 50 gm and volume 30 cc. On over drying it weighs 38 gm and its new volume is 26 c.c (by mercury displacement) find the shrinkage limit. Take  $G = 2.65$ . 7

4. (a) Discuss how the dry density of a soil varies with the water content during the process of compaction. Explain zero air void line also. 7

(b) A direct shear test was conducted for a sandy soil in unconsolidated undrained condition and the following results were obtained : 7

S. No.	Normal stress Kpa	Max. Shear stress Kpa
1	10	8.50
2	20	14.50
3	30	19.0

Draw the strength envelope and determine the shear parameters.

5. (a) Write the equation for finding bearing capacity of soil. Explain each term used therein. Justify the assumptions made. 7

(b) What is N value ? How it is determined at the site ? Explain the applications of N-value. 7

6. (a) What is the difference between shallow foundation and deep foundation ? Classify pile foundations. 7
- (b) Why under-reamed pipes are provided in case of saturated clay with high expansion condition ? Draw a neat sketch while explaining your answer. 7
7. Write short notes on *any four* :  $4 \times 3\frac{1}{2} = 14$
- (a) Darcy's law
- (b) EMR formula
- (c) Stoke's law
- (d) Limitation of direct shear test
- (e) Factors affecting bearing capacity of soil.
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