

01672

DIPLOMA IN CIVIL ENGINEERING

Term-End Examination

June, 2011

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

Time : 2 hours

Maximum Marks : 70

Note : Question no.1 is compulsory. Attempt any four questions more out of question number 2 to 7. All questions carry equal marks.

1. (a) The dry density of a soil with 20% water content is 18 kN/m^3 . The submerged density in kN/m^3 will be : **7x2=14**

(i) 21.6 (ii) 21.58

(iii) 11.28 (iv) 5.60

(b) Meniscus correction in hydrometer is :

(i) positive (ii) negative

(iii) both (iv) depends on soil type

- (c) The ratio of average permeabilities when flow is parallel to the bedding plane to the condition when flow is perpendicular to the bedding plane is :
- (i) greater than one
 - (ii) less than one
 - (iii) equal to one
 - (iv) none of the above
- (d) Which of the following condition of drainage in direct shear test cannot be maintained easily ?
- (i) Unconsolidated undrained
 - (ii) Consolidated undrained
 - (iii) Consolidated drained
 - (iv) None of the above
- (e) Which roller is most suitable for cohesive soils ?
- (i) Smooth wheel roller
 - (ii) Pneumatic type roller
 - (iii) Sheep foot roller
 - (iv) Ordinary roller
- (f) Which of the property of soil is affected by the disturbance of the soil sample ?
- (i) Modulus of elasticity
 - (ii) Shear parameters
 - (iii) Compression index
 - (iv) All of the above

- (g) In case of highly expansive soil which of the following pile is provided :
- (i) compaction piles
 - (ii) sheet piles
 - (iii) under reamed piles
 - (iv) tension piles
2. (a) Define void ratio, porosity, degree of saturation, percentage air voids, air content specific gravity and water content. 7
- (b) A sample of soil has a volume of 65 mL and weighs 0.96 N. After complete drying in oven its weight reduces to 0.785 N. If the specific gravity of the soil particles is 2.65, determine the degree of saturation. 7
3. (a) Discuss how sieve analysis is carried out in the laboratory for the gradation analysis of coarse grained soil. 7
- (b) A saturated soil has weight 40 gm and volume 20 cc. on drying it weighs 30 gm and volume 16cc (which is determined by displacement of mercury) Find shrinkage limit, if $G = 2.70$. 7
4. (a) Define permeability and discuss its importances. What is Darcy's law. 7

(b) A clay deposit consists of a series of thin layer of silt, 10 mm thick after every 2.0 m thick layer of clay. The silt is 100 times more permeable than clay. Find the ratio of horizontal to vertical permeabilities. 7

5. (a) Explain unconfined compression test. Discuss its advantages and limitations. 7

(b) The following results are obtained from a series of drained direct shear test on a soil sample. Plot the strength envelope and determine the strength parameters. 7

S.No.	Normal stress (kPa)	Max. shear stress (kPa)
1	10	9.0
2	20	15.0
3	30	20.0

6. (a) Discuss the factors affecting compaction. 7

(b) What is standard penetration test ? What are the corrections applied to N-value ? Discuss its importance. 7

7. (a) What are the different modes of shear failure of the shallow foundation ? Discuss. 7
- (b) A pre cast pile is being driven with 60 kN hammer having a free fall of 1.0 m. If the penetration in the last blow is 6 mm, determine the allowable load carrying capacity of the pile. Use Engineering News Records (ENR) formula. 7
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