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Total No. of Pages : 02

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M.Tech.(Soil Mechanics and Foundation Engineering)/(Geo Technical Engineering) (2013 Batch) (Sem.-2)

### SHEAR STRENGTH OF SOILS

Subject Code : CESE-6

M.Code : 71579

Time : 3 Hrs.

Max. Marks : 100

#### INSTRUCTION TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWENTY marks.

- Q1. a) Soil in our country is classified on the basis of Geology of soils. Discuss in detail.(10)
- b) Discuss about few problems in soil engineering where a knowledge of shear strength is essential. Elaborate any two problem in detail. (10)
- Q2. a) Define 'Shear strength' of soils. Is it possible to tabulate the values of shear strength for different soils? (10)
- b)  $\overline{CU}$  tests carried out on a saturated normally consolidated clay showed that  $C_u = 0$  and  $\phi_u = 15^\circ$ . If the pore pressure coefficient 'A' at failure was 0.92, what are the values of  $c'$  and  $\phi'$  for the soil. (10)
- Q3. a) Differentiate between : (10)
- i) Hydrostatic pressure and seepage pressure
  - ii) pore water pressure and effective stress
- b) A layer of clay is 10mm thick underlies on a sandy layer 15 mm thick. If water table is lowered from 2m to 10m below the ground surface, determine the settlement of the ground surface due to compression of clayey layer, given the following data : (10)

Sand  $\gamma = 18\text{kN/m}^3$

Clay :  $\gamma_b = 9 \text{ kN/m}^3$

$\gamma_b = 10\text{kN/m}^3$

$w_n = 35\text{p.c. (\%)}$

$w_l = 45 \text{ p.c. (\%)}$

- Q4. a) Define pore pressure parameters  $A$ ,  $B$ ,  $\bar{A}$  and  $A_f$ . (10)
- b) What is the critical state model? Give its significant features. (10)
- Q5. a) Show with figure (s) the events that occurs during one dimensional consolidation of a partially saturated soil in an Oedometer. (10)
- b) Explain the following : (i) Rankine Theory (ii) Heigh's Theory) (10)
- Q6. a) Obtain an expression for the critical hydraulic gradient necessary for a quick condition to develop by using (i) total stress approach (ii) effective stress approach. (12)
- b) Distinguish between (i) C-U test and C.D test (ii) Maximum stress theory and elastic strain theory. (8)
- Q7. a) With the help of diagrams show the effective stress paths for varying degree of drainage during triaxial test. (12)
- b) "*The specimen under greater effective stress has greater strength.*" Give your comments. (8)
- Q8. a) Write down the various factors on which the dissipation of pore water pressure depends. (10)
- b) Distinguish between : (10)
- i) N-C soils and O.C. soils.
- ii) Angle of shearing resistance and angle of repose.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**