(12)

Department of Civil Engineering
CEL 222 Engg. Geology and Soil Meehanies
Major Test -1 (part –soil)

Assume suitable value of missing data if necessary to solve questions.
Write units clearly

May 7th, 2007
10:30am - 12:30noon
Maximum Marks:100

Answer all questions

Q 1. Four equations are given below. Write the meaning and units of each parameter. Also write when would you like to use these equations.

$$\rho = \frac{\Delta e}{1+e_0} D \qquad (1) \qquad \rho = \left(\frac{a_v}{1+e_0}\right) .. D .. \Delta\sigma' \qquad (2)$$

$$\rho = C_c \log\left(\frac{\sigma' + \Delta\sigma'}{\sigma'}\right) \frac{D}{1+e_0} \qquad (3) \qquad \rho = m_v \, D. \, \Delta\sigma' \qquad (4)$$

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Q 2. For a constant head permeability test on a sand (e = 0.46), the values are given:

Length of specimen = 25 cm Diameter of specimen = 6.25cm
Head difference = 45 cm water collected in 20 min = 5 cm^3

Show in the diagram above values and giving the equations, and units determine
(i) Permeability (ii) Discharge velocity (iii) Seepage velocity

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Q 3. The results of two drained triaxial shear tests on saturated clay follow:

Specimen	σ_3 kg/cm^2	$(\Delta\sigma_d)_f$ kg/cm^2
1	1.0	2.5
2	1.5	3.4

Determine the shear strength parameters c, ϕ, c', ϕ' **(40)**

Q 4. From among the ranges of numerical values given, select the range valid for the following parameters:

a Water content, w in %

(i) $w \le 0$ (ii) $0 < w < 100$ (iii) $0 \le w \le 100$ (iv) $0 \le w$

b Liquid limit for clayey soil

(i) LL <100 (ii) LL > 0 (iii) LL = 0 (iv) 0 < LL < 100

c Pore water pressure u in a consolidation test at the end of consolidation

(i) $u = 0$ (ii) $u > 0$ (iii) $u < 0$ (iv) u = Cell pressure

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