(Please write your Exam Roll No.) Exam Roll No. 05125603414

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH] MAY-JUNE 2016

Paper Code: ETCE-210 **Subject: Soil Mechanics**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q.no.1 which is compulsory. Make necessary assumptions wherever required and clearly state them.

Q1 Explain the following: **(5x5=25)**

(a) Degree of Saturation
(b) Factors affecting permeability
(c) Contact pressure distribution
(d) Concept of optimum moisture content
(e) Shear strength of soil

Q2 (a) Explain the utility of three phase diagram. **(3.5)**

(b) A soil sample has a diameter of 38 mm and height of 76 mm. Its wet weight is 1.15 N. Upon drying its weight reduced to 0.5 N. G_s is 2.7. In the wet state what was the Degree of Saturation and the water content of the soil sample. Comment on the values of w and S. **(9)**

Q3 (a) Explain why do we need to classify the soils. **(4)**

(b) Explain how the grain distribution of the soil is obtained in the laboratory. **(4.5)**

(c) Explain the concept of pore water pressure. **(4)**

Q4 (a) Explain the terms exit gradient and uplift pressure with respect to seepage through earth dams. Also explain what do you understand by piping failure. **(6)**

(b) Derive the expression for obtaining permeability by falling Head permeameter. **(6.5)**

Q5 (a) Explain the procedure for determination of pre-consolidation pressure. Also explain how it is determined. **(5)**

(b) From the fundamental principle, derive the condition of continuity and explain how it is used in Tezaghi's one dimensional Consolidation Theory. **(7.5)**

Q6 (a) A layer of clay 8 m thick is located between two sand layers. The Coefficient of Consolidation of the clay is 4.9×10^{-8} m^2/sec. Fill material was placed above the top sand layer over a very large area. After 3 years, what percentage of the additional stress due to the fill material will be carried by the soil grains at the middle of the clay layer? **(6.5)**

(b) The void ratios after complete consolidation had occurred at various effective stresses in a consolidation test were determined to be as follows:

σ' kN/m2	50	100	200	400	800
E	1.82	1.77	1.68	1.56	1.39

Determine the Coefficient of Volume Compressibility (m_v) for the effective stress range of 300 to 600 kN/m^2. **(6)**

P.T.O.