Code: 9D12101

M.Tech I Semester Regular & Supplementary Examinations February 2016

ADVANCED SOIL MECHANICS

(Geotechnical Engineering)

(For students admitted in 2011, 2012, 2013, 2014 and 2015 only)

Time: 3 hours Max Marks: 60

Answer any FIVE questions

All questions carry equal marks

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1 Explain the following:
(a) Diffused double layer.
(b) Isomorphous substitution.
(c) Specific surface.
(d) Soil fabric.

2 (a) Explain engineering properties of clay minerals in detail.
(b) What are the factors affecting permeability?

3 (a) What are the characteristics of flow net? Explain uses of flow net.
(b) What is the criterion for filter design?

4 Consolidated undrained test were conducted of a saturated clay soil given the following results:

Cell pressure σ_3 (kN/m^2)	Deviator stress σ_d (kN/m^2)	Pore water pressure U(kN/m^2)
150	102	80
300	200	164
450	304	264
600	405	325

Determine the effective stress strength parameters C' and $\emptyset'$ by Mohr circle method and modified strength envelop method.

5 (a) Write short notes on thixotropy.
(b) What are the different types of liquefaction? Explain mitigation methods to minimize the liquefaction.

6 Explain the shear strength of granular soils under plain strain condition. Give a simple correlation to obtain friction angle.

7 (a) Explain consolidation by sand drains.
(b) What is the effect of secondary consolidation on preconsolidation pressure?

8 (a) What is shear strength? Draw the typical Mohr failure envelopes including Mohr circles from CD, CU and UU tests conducted on both normally consolidated (loose) and over consolidated (dense) clays in terms of total stresses and effective stresses.
(b) What is critical void ratio? Describe its significance.

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