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V SEMESTER B.TECH. (CIVIL ENGINEERING)

END SEMESTER EXAMINATIONS, NOV/DEC 2017

SUBJECT: GEOTECHNICAL ENGINEERING [CIE 3101]

REVISED CREDIT SYSTEM
(/ /)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	The following results were obtained from a laboratory test on three soil samples. Classify the Soils as per Indian Standard Soil Classification System Sieve Size / % passing: Soil A: 4.75 mm: 68; 75µm: 10; Liquid Limit: -; Plastic Limit: NP Soil B: 4.75 mm: 98; 75µm: 84; Liquid Limit: 22.4%; Plastic Limit: 15.2% Soil C: 4.75 mm: 100; 75µm: 70; Liquid Limit: 32.8%; Plastic Limit: 24.3% NP-NonPlastic	**6**
1B.	The Atterberg's limits for a clay soil used for an earth dam are liquid limit 60%, plastic limit 40%, and shrinkage limit 25%. If a specimen of the soil of volume 10cm^3 at the liquid limit has a volume of 6.5 cm^3 when dried, what would be the shrinkage ratio of soil particles?	**4**
2A.	Explain with neat sketch a) Single grained soil structure b)Flocculated soil structure	**3**
2B.	Define in case of a flow net a) Field b)exit gradient	**2**
2C.	Define Coefficient of Compressibility. Explain Square root time fitting method, to determine coefficient of consolidation.	**5**
3A.	A constant head permeability test was conducted on a sand sample of 250 mm length and 2000mm^2 cross sectional area. The head loss was 500 mm, and the quantity of flow was found to be 260ml in 130 seconds. Determine the coefficient of permeability of the sand sample. Find the discharge and seepage velocity if the dry unit weight and specific gravity of the samples were 18 kN/m^3 and 2.62 respectively.	**3**
3B.	What are the properties of flow net? Explain	**3**
3C.	Explain three phase system of soil.	**2**
3D.	Due to pressure water flows upward through a fine sand stratum 2m thick.	**2**

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	The sand deposit has porosity of 38%, bulk density 20.8 kN/m^3 and water content of 30%. Determine the head at which quicksand condition will develop.	
4A.	A rectangular area 3m X 6m carries a uniform pressure of 100 kN/m^2 at the ground surface. What will be the vertical pressure at 5m below the centre of the loaded area? Use equivalent point load method.	**2**
4B.	In the process of an excavation of wall footing, the water table level was found to be at a depth of 4m below the ground surface, for a sand layer. A soft clay is found 12m from ground surface. If the soil above ground water table has a 50% of saturation, draw pressure distribution diagrams for total, neutral and effective stress case for the layer of sand. Take G=2.68. e=0.6 (for sand).	**4**
4C.	Explain compaction control in the field	**4**
5A.	Explain Mass Spring analogy for consolidation of soil	**2**
5B.	A cylindrical soil specimen failed at an axial stress of 8.4 kN/m^2 in an unconfined compression test. The failure plane makes an angle of 54 degree with the horizontal. Determine the shear strength properties from Mohr's circle. Check by analytical method.	**4**
5C.	A direct shear test conducted on identical soil specimens gave the following results Specimen | Normal Stress (kN/m^2) | Shear Stress (kN/m^2) 1 | 50 | 40 2 | 100 | 70 Determine the shear strength parameters. If an undrained triaxial test was conducted on the same soil and at the same density and water content with a cell pressure of 75 kN/m^2, estimate the deviator stress at failure.	**4**