CLASS: BE	**SEMESTER: III**
BRANCH: CIVIL	**SESSION : MO/2018**

SUBJECT : CE3005 GEOTECHNICAL ENGG I

TIME: 1.5 HOURS	**FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) Derive the functional relationship of dry unit weight in terms of percent air voids, specific gravity and water content.   [2]

   (b) A sample of saturated soil has a volume of 16.5 cc and weighs 35.1 gm. On oven drying, weight of the sample reduces to 29.5 gm. Determine e, w, γ_d & G, symbols having their standard significance.   [3]

Q2 (a) A soil sample has a diameter of 38mm and a height of 76mm. Its wet weight is 1.15N. Upon drying its weight reduced to 0.5N. Calculate the bulk unit weight and dry unit weight of the soil sample, G = 2.7. Comment on the magnitudes of both.   [2]

   (b) Enumerate and discuss all the tests used for the field identification of fine grained soils.   [3]

Q3 (a) Explain the following:- (i) GW (II) SP (iii) ML (iv) CH and appraise them as an engineering material.   [2]

   (b) State Stokes law. Compute the grain size of a soil particle in millimeter from the following given data: - t = 15minutes, μ = 0.00855 poise, H_e = 15.5cm, G = 2.67, symbols having their standard significance. Deduce the formula used.   [3]

Q4 (a) Define (i) Bentonite (ii) Boulder Clay (iii) Laterite (iv) Lacustrine deposit.   [2]
   (b) Explain the procedure for calibration of the hydrometer.   [3]

Q5 (a) Prove that equipotential lines and stream lines are normal to each other.   [2]

   (b) Develop a neat labelled sketch of the experimental set up for determination of coefficient of permeability by constant head method.   [3]

Q6 (a) The lower end of a clean glass capillary tube with an inside diameter of 0.2mm is immersed in a container of water. Calculate the maximum height to which the water rises and the magnitude of the corresponding water pressure which develops. Derive the expression used.   [2]

   (b) An excavation is to be performed in a stratum of clay 9m thick, underlain by a bed of sand. In a bore hole, the ground water is observed to rise up to an elevation of 3m below ground surface. Estimate the depth to which excavation can be safely carried out without bottom becoming unstable under uplift pressure of ground water. G = 2.7 and e = 0.7.   [3]