KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agrl.Engg.) 2015 Admission
IIIrd Semester Final Examination-January-2017

Cat. No: Lwre.2103.

Marks: 50.00

Title: Geotechnical Engineering(2+1)

Time: 2 hours

I Fill up the blanks/Define/True or False (10x1=10)

1. The ratio of volume of water present in a given soil mass to the volume of voids in it is known as -----------
2. If the void ratio of a certain soils is 1.234, then the porosity is -----------
3. Define relative porosity.
4. Define coefficient of uniformity.
5. Define plastic state of soil.
6. The maximum intensity of loading which the soil can carry without being detrimental to the normal functioning of a foundation is called as -----------
7. The lateral pressure exerted by the soil when the wall moves into the soil is called as -----------
8. The phreatic line in an earth dam is ----------- in shape.
9. Plate load test is used to determine -----------
10. Slit particles are visible to the naked eye.(T/F)

II Write short notes/answers on any FIVE of the following (5x2=10)

1. What are the assumptions in Rankine's earth pressure theory?
2. Differentiate cohesionless and purely cohesive soils.
3. Differentiate toe failure and slope failure.
4. Distinguish between compaction and consolidation.
5. What is the significance of vane sheer test?
6. What is the degree of saturation of soil, if in a given mass, void ratio is 0.61, water content is 0.188 and specific gravity of soil particles is 2.68.
7. Calculate the factor of safety in an infinite slope at point 5m below the surface. The slope angle with the horizontal is 20°, and the effective shear parameters for the given soil as c=10kN/m^2 and ϕ= 30°; unit weight of the moist soil = 19 kN/m^3.

III Write short answers on any FIVE (5x4=20)

1. The dry unit weights of sand in the loosest and densest states are 13.34kN/m^3 and 21.40 kN/m^3. Assuming the specific gravity of the solids as 2.67, determine the relative density of sand with porosity of 30%.
2. Write short notes on Coulomb wedge theory.
3. Write short notes on Mohr-coulomb failure theory.
4. Discuss in detail about the different ways to improve the stability of slopes.
5. Discuss about the different Atterberg's limits.
6. Describe the Unified soil classification.
7. The void ratio and specific gravity of a sample of clay are 0.73 and 2.7 respectively. If the voids are 92% saturated, find the bulk density, dry density and the water content.

IV **Write essay on any ONE**   (1x10=10)

1. Discuss at length about the Standard Proctor Compaction Test.
2. A wall with a smooth vertical back, 10 m high, supports a purely cohesive soil with c = 9.81 kN/m^2 and γ=17.66 kN/m^3. Determine (a) total Rankine's active pressure against the wall; (b) position of zero pressure; (c) distance of the centre of pressure above the base.

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