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Question Paper Code: 54105

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Fourth Semester

Civil Engineering

15UCE405-SOIL MECHANICS

(Regulation 2015)

Duration: 1:15hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. Ratio of volume of voids to total volume of solids is known as CO1-R
(a) void ratio (b) porosity (c) degree of saturation (d) air content
2. At shrinkage limit ,the soil is CO1-R
(a) dry (b) partially saturated (c) saturated (d) none of above
3. The property of a soil which permits flow of water through its interconnected voids is called CO2-R
(a) seepability (b) porosity (c) permeability (d) void ratio
4. Bossinesq solution is based on the assumption CO2-R
(a) soil is homogenous (b) self weight of soil is considered
(c) soil is initially stressed (d) soil is fully saturated
5. Compaction of a soil is measured in terms of CO3-R
(a) dry density (b) specific gravity (c) compressibility (d) permeability
6. The ratio of settlement at any time 't' to the final settlement is known as CO3-R
(a) Co-efficient of consolidation (b) Degree of consolidation
(c) Consolidation index (d) Consolidation of undisturbed soil
7. ---- is a field test for determination of shear strength of soil CO4-R
(a) vane shear test (b) direct shear test (c) triaxial compression test (d) UCC test

8. The shear strength of plastic undrained clay depends on CO4-R
 (a) Internal friction (b) Cohesion (c) Both (a) and (b) (d) Neither (a) nor (b)
9. The following assumption is not made for the friction circle method of CO5-R
 slope stability analysis
 (a) Friction is fully mobilised
 (b) Total stress analysis is applicable
 (c) The resultant is tangential to the friction circle
 (d) The resultant passes through the centre of friction circle
10. In stability analysis, the term modified shear strength is referred to as CO5-R
 (a) shear strength (b) maximum shear stress
 (c) applied shear stress (d) none of these

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. The mass of a chunk of moist soil is 20 kg, and its volume is 0.011 CO1-App (8)
 m^3 . After drying in an oven, the mass reduces to 16.5 kg. Determine
 the water content, the density of moist soil, the dry density, void ratio
 and the degree of saturation. Take $G= 2.70$
12. A sand deposit is 10 m thick and overlies a bed of soft clay. The CO2-App (8)
 ground water table is 3 m below the ground surface. If the sand above
 the ground water table has a degree of saturation of 45%, plot the
 diagram showing the variation of the total stress, pore water pressure
 and the effective stress. The void ratio of the sand is 0.70. Take
 $G=2.65$.
13. Explain the various methods used for compaction of soil. CO3-U (8)
14. A shear vane of 7.5 cm diameter and 11.0 cm length was used to CO4-App (8)
 measure the shear strength of soft clay. If a torque of 600 N-m was
 required to shear the soil, calculate the shear strength.
 The vane was then rotated rapidly to cause remoulding of the soil. The
 torque required in the remoulded state was 200 N-m. Determine the
 sensitivity of the soil.
15. Explain friction circle method for stability analysis of slope. CO5-App (8)