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Question Paper Code: 34102

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

Fourth Semester

Civil Engineering

01UCE402 – SOIL MECHANICS

(Regulation 2013)

Duration: 1:15hrs

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. If the pores of a soil are completely filled with air, the soil is said to be
 - (a) Wet soil
 - (b) dry soil
 - (c) fully saturated soil
 - (d) partially saturated soil
2. Toughness index is the ratio of
 - (a) Flow index and plasticity index
 - (b) plasticity index and flow index
 - (c) liquidity index and flow index
 - (d) flow index and liquidity index
3. The rate of expulsion of pore fluid is directly dependent on the _____ of the soil.
 - (a) Shear strength
 - (b) void ratio
 - (c) permeability
 - (d) flow net
4. The possibility of quick sand condition will be there when flow of water to soil is
 - (a) Horizontal
 - (b) upwards
 - (c) downwards
 - (d) laterals
5. Compaction of a soil is measured in terms of
 - (a) dry density
 - (b) specific gravity
 - (c) compressibility
 - (d) permeability

6. When Consolidation of a Saturated soil Sample occurs, the degree of Saturation
- (a) increases (b) decreases
(c) Remains constant (d) May increases or decreases
7. When drainage is permitted throughout the triaxial test, the test is known is
- (a) Quick test (b) Drained Test
(c) Consolidated undrained test (d) None of these
8. Assess the Coulomb's equation for shear strength is
- (a) $c = s + \sigma \tan \phi$ (b) $c = s - \sigma \tan \phi$
(c) $s = c + \sigma \tan \phi$ (d) $s = c - \sigma \tan \phi$
9. The failure occurs by rotation along a slip surface by downward and outward movement of the soil mass is
- (a) Rotational Failure (b) Wedge Failure
(c) Compound Failure (d) Translational Failure
10. Method useful for Stability analysis of slopes made of homogeneous soils
- (a) Friction Circle (b) Swedish Circle
(c) Fellenius method (d) None of these

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. A natural soil deposit has a bulk unit weight of 18 kN/m^3 and water content 5%. Calculate the amount of water required to be added to 1 m^3 of soil to raise the water content to 15%. Assume the void ratio to remain constant. What will then be the degree of saturation? Assume $G = 2.67$. (8)
12. Explain the method of determining the co-efficient of permeability using the falling head permeameter test with neat sketch. (8)
13. Discuss the factors affecting settlements. (8)
14. A sample of cohesionless soil in a direct shear test fails under a shear stress of 170 kN/m^2 when the normal stress is 200 kN/m^2 . Find the angle of shearing resistance and the major principal stress at failure. (8)
15. Discuss methods for finding the stability of slopes and derive an expression for finding the factor of safety of slopes in cohesive soils. (8)