[6179]-201

S.E. (Civil)
GEOTECHNICAL ENGINEERING
(2019 Pattern) (Semester - IV) (201008)

Time : 2½ Hours]   *[Max. Marks : 70*

Instructions to the candidates:
1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
2) *Figures to the right indicate full marks.*

Q1) a) Explain Standard Proctor Compaction Test with neat sketch. **[6]**

     b) A concentrated load of 30 kN acts on the surface of homogenous soil mass of large extent. Find the stress intensity at a depth of 8m and horizontal distance of 2.5 m by using Boussinesq's theory. Compare the value with Westergaard's theory. **[6]**

     c) Enlist and explain factors affecting compaction. **[5]**

OR

Q2) a) Differentiate between Standard proctor Test and Modified Proctor Test. Draw typical compaction curve for both the tests. **[6]**

     b) State and explain the terms involved in Boussinesq's point load and circular load equation for vertical stress determination. **[6]**

     c) Write a note on Proctor needle test with neat sketch. **[5]**

Q3) a) Explain with the help of Mohr circle how shear strength parameters are determined in direct shear test. **[6]**

     b) Explain the types of triaxial test according to drainage conditions. **[6]**

     c) A vane 75 mm in diameter and 150 mm in height was pressed into clay in a bore hole. The torque was applied and gradually increased to 50 N.m when failure took place. Determine underained shear strength. **[5]**

OR

Q4) a) A soil has an angle of shearing resistance 18° and cohesion of 30 kN/m². If the specimen of this soil is subjected to triaxial compression test, determine the value of cell pressure for failure to occur at a total stress of 300 kN/m². Also calculate deviator stress. **[7]**

b) State and explain factors affecting shear strength of cohesive soil. **[6]**

c) Define total and effective stresses. **[4]**

Q5) a) In a cohesionless soil deposit having unit weight of 15 kN/m³ and angle of internal friction 30°. Determine resultant active and passive earth pressure and their positions, if the height of retaining wall is 10 m. **[6]**

b) Explain step by step procedure for determination of lateral earth pressure graphically by Rebhann's method with neat sketch. **[6]**

c) Discuss how to calculate earth pressure of soil for Backfill with uniform surcharge. **[6]**

OR

Q6) a) Define the various types of earth pressures w.r.t. wall movement with sketches. **[6]**

b) Explain step by step procedure for determination of lateral earth pressure graphically by Culmann's method with neat sketch. **[6]**

c) A smooth backed vertical wall is 6.3 m high and retains a soil with a bulk unit weight of 18 kNm³ and angle of internal friction 18°. If the soil surface carries a uniformly distributed load of 5 kN/m². Determine total active earth pressure and its point of application. **[6]**

Q7) a) Explain classification of slopes based on different criteria. **[6]**

b) What is Taylor's Stability Number? How it can be used to chek the stability of slopes? **[6]**

c) Classify the different modes of failure of finite and infinite slope. **[6]**

OR

Q8) a) Write a note on causes and remedial measures of landslide. **[6]**

b) Explain 'Swedish Slip Circle' method for stability analysis of finite slope. **[6]**

c) Derive the expression for factor of safety for dry infinite slope in sandy soils. **[6]**

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