Total No. of Questions : 8]

SEAT No. :

P593

[Total No. of Pages : 3

[5869]-206
S.E. (Civil)
GEOTECHNICAL ENGINEERING
(2019 Pattern) (Semester - IV) (201008)

Time : 2½ Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn whenever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data, if necessary and mention it clearly.***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Differentiate between light compaction test and heavy compaction test. Draw typical compaction curve for both test. **[6]**

b) Describe "Proctor needle in field compaction control". **[6]**

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

OR

Q2) a) Explain the factors affecting Compaction of soil. **[6]**

b) What is pressure bulb? Explain its significance and draw a neat sketch of pressure bulb for concentrated point loading. **[6]**

c) A concentrated load of 25 kN acts on the surface of homogeneous soil mass of large extend. Calculate stress intensity at a depth of 8.0m by using Boussinesq's theory at a horizontal distance of 2.5m. **[6]**

Q3) a) State Mohr- Coulomb's equation for shear strength of soil. Discuss the factors which affect the shear strength parameters of soil. **[6]**

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b) Determine the shear strength in terms of effective stress on a plane within a saturated soil mass at a point where the total normal stress is 200 kN/m^2 and pore water pressure is 80 kN/m^2. The shear strength parameters in terms of effective stress are, c' = 16 kN/m^2 and $\Phi' = 39^0$. **[6]**

c) Explain different drainage conditions in triaxial test. **[5]**

OR

Q4) a) State and explain the merits and demerits of direct shear test. **[6]**

b) In a consolidated drained triaxial test, a specimen of a clay fails at a cell pressure of 60 kN/m^2.The effective shear strength parameters are c = 15 kN/m^2 and φ =20°. Determine the additional stress required for the failure. **[6]**

c) Explain vane shear test procedure with a neat sketch and formula. **[5]**

Q5) a) Discuss coulomb's wedge theory for determination of earth pressure. **[6]**

b) A wall with a smooth vertical back, 10m high, supports a purely cohesive soil with c = 9.81 kN/m^2, & γ = 17.66 kN/m^3. Determine (i) Total Rankin's active pressure against the wall; (ii) Position of zero pressure. **[6]**

c) Explain Rehbann's graphical method for evaluation of earth pressure. **[6]**

OR

Q6) a) Describe effect of wall moment with respect to earth pressure. **[6]**

b) Compute the intensity of active earth pressure at a depth of 8 m in dry cohesionless sand with an angle of internal friction 30^0 and unit weight of 18 kN/m^3. **[6]**

c) Explain Culmann's graphical method for evaluation of earth pressure. **[6]**

Q7) a) Classify the different modes of failure of finite and infinite slopes. **[6]**

b) Discuss causes and remedial measures of Landslides. **[6]**

c) Analyze the stability of soil using friction circle method with neat sketch. **[5]**

OR

Q8) a) Explain the various methods to protect slopes from failure with clear sketch. Also list out the factors to be considered in selection of suitable method. **[6]**

b) Explain steps involved in the stability analysis of slopes by method of slices. **[6]**

c) Discuss "Taylor's Stability Number" for stability analysis of finite slope. **[5]**

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