

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, $c' = 16 \text{ kN/m}^2$ and $\Phi' = 39^\circ$. [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 $c = 15 \text{ kN/m}^2$ and $\phi = 20^\circ$. 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 $c = 9.81 \text{ kN/m}^2$, & $\gamma = 17.66 \text{ kN/m}^3$. 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° 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]

