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8E4031

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B.Tech. VIII Semester (Old Back) Examination, April/May-2017  
Civil Engineering  
8CE1(O) Geotechnical Engineering-II

Time : 3 Hours

Maximum Marks : 80  
Min. Passing Marks : 26**Instructions to Candidates:**

Attempt any **five questions**, selecting **one question** from **each unit**. All questions carry **equal marks**. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

**Unit-I**

1. a) Explain Westergard's theory for determination of the vertical stress at a point. Discuss various approximate methods for determination of the vertical stress at a point. What are their limitations. (8)
- b) A concentrated load of 200t is applied at the ground surface. Compute the vertical pressure : (4+4)
  - i) At a depth of 5m below the load.
  - ii) At a distance of 4m at the same depth. Use Boussinesq's equation.

**(OR)**

1. a) What do you understand by Isobar? Show the isobar for two load intensities and explain the application of the same. (8)
- b) What are the assumptions of Boussinesq's analysis of stresses due to vertical loads, draw stress distribution diagram due to point load. (4+4)
  - i) A long vertical line and
  - ii) A long Horizontal line

**Unit-II**

2. a) What are assumptions of Terzaghi's one dimensional theory of consolidation? Discuss its limitations. (8)
- b) A clay soil sample 24mm thick was obtained from the field and tested in the laboratory. The sample reached 50% Consolidation in 25minutes. If the thickness of the layer from which the sample was taken is 4.8m, how much it will take to reach same degrees of consolidation. (4+4)
- i) If the layer has double drainage
- ii) If the layer has single drainage

(OR)

2. a) What is difference between compaction and consolidation? (8)
- b) Define the terms "Compression Index" "Coefficient of Consolidation" and coefficient of compressibility and indicate their units and symbols. (8)

**Unit-III**

3. a) Describe culmann's method for stability analysis of homogeneous slope. What are its limitations? (8)
- b) Describe frictional circle method of stability of slope. (8)

(OR)

3. What are different types of slope failure? Derive an expression for the factor of safety of infinite slope in a cohesionless soil. (16)

**Unit-IV**

4. a) Write short notes : (3×2=6)
- i) Earth pressure at rest
- ii) Active earth pressure
- iii) Passive earth pressure
- b) What are the assumptions of Rankine's theory? Derive the expressions for active pressure. (10)

(OR)

4. a) Explain culmann's graphical method for active earth pressure. (8)
- b) A retaining wall has a vertical back and is 8m high, with horizontal backfill. Determine active and passive earth pressure on wall per unit length. Take  $C = 100 \text{ kN/m}^2$  (8)

$$\phi = 0$$

$$r = 1 \text{ g kN/m}^3$$

Unit-V

5. a) Describe plate load test. What are its limitation and uses? (10)
- b) Explain the following : (3×2=6)
- i) Ultimate bearing capacity
  - ii) Allowable bearing pressure
  - iii) Gross load intensity

(OR)

5. a) What are the assumptions of Terzaghi's theory of bearing capacity? Discuss its limitations. (8)
- b) Determine net safe bearing capacity of a footing of size  $2\text{m} \times 3\text{m}$  resting at a depth of  $1.5\text{m}$  on a soil having  $\rightarrow C = 0, \phi = 35^\circ, r = 18\text{kN/m}^3$  Take  $N_c = 25, N_q = 13, N_r = 11$ . (8)

