6E6032

Roll No. _____ Total No of Pages: 4

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B. Tech. VI-Sem. (Main & Back) Exam., April/May-2016
Civil Engineering
6CE2A Geotechnical Engineering - II

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 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 may suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL 2. NIL

UNIT-I

Q.1 (a) Discuss various approximate methods for the determination of the vertical stress at a point. What are their limitations? [8]

(b) What do you understand by contact pressure? What are the factors that affect the contact pressure distributions? Draw the contact pressure distribution diagram for flexible and rigid footings on sand and clayey soil. [8]

OR

Q.1 (a) Discuss the basis of westerguaard's theory. What is an influence line diagram? What is its use in practice? [8]

(b) A concentrated load of 50KN acts on the surface of a homogeneous soil mass of large extent. Determine the stress intensity at a depth of 5m [8]

(i) Directly under the load and

(ii) At a horizontal distance of 2.5m.

UNIT-II

Q.2 (a) Differentiate between normally consolidated and over consolidated soils. How would you determine the over consolidation pressure. [8]

(b) Define the following terms – [8]

(i) Coefficient of volume change.

(ii) Compression index

(iii) Coefficient of compressibility

(iv) Expansion index

OR

Q.2 (a) What is coefficient of consolidation? What is it's use in the settlement analysis? How it is determined? [8]

(b) The laboratory consolidation data for an undisturbed clay sample are as follows – $e_1 = 1.00$, $\bar{\sigma}_1 = 85KN/m^2$ and $e_2 = 0.80$, $\bar{\sigma}_2 = 465KN/m^2$ Determine the void ratio for a pressure of $\bar{\sigma}_3 = 600KN/m^2$ [8]

UNIT-III

Q.3 (a) Describe bishop's simplified method. What are its advantages over Swedish circle method? [8]

(b) What are different factor of safety used in the stability of slopes? Discuss the method of checking the stability of an infinite slope in cohesive soil. What is critical height? [8]

OR

Q.3 (a) How a slope is analyzed using Swedish circle method? Derive an expression for the factor of safety. [8]

(b) A long natural slope is an over consolidated clay ($c' = 10KN/m^2$, $\phi' = 25°$, $\gamma_{sat} = 20KN/m^3$) is inclined at 15° to the horizontal. The water table is at the surface and the seepage is parallel to the slope. If a plane slip had developed at a depth of 4m below the surface, determine the factor of safety. [8]

UNIT-IV

Q.4 (a) What are the assumptions of Rankine's theory? Derive the expression for active pressure. [8]

(b) Describe Rebhann's construction. What is its use? [8]

OR

Q.4 (a) What are assumption's in coulomb's theory? Compare Rankine and coulomb theory. [8]

(b) A retaining wall 7m high, with its back face smooth and vertical. It retains sand with its surface horizontal. Using Rankine theory, determine active earth pressure at the base of backfill when

(i) It is dry

(ii) Saturated and

(iii) Submerged with water table at surface.

Take $\gamma = 18KN/m^3$, $\phi = 30°$ and $\gamma_{sat} = 21KN/m^3$. [8]

UNIT-V

Q.5 (a) Define the following terms – [8]

(i) Net safe bearing capacity

(ii) Gross safe bearing capacity

(iii) Allowable soil pressure

(iv) Local and general shear failure

(b) Describe plate load test in detail. What are its limitations and applications. [8]

OR

Q.5 (a) Discuss various types of soil sampler. What is it's use? What are the factors that affect the disturbance of sample? How it is evaluated? [8]

(b) A strip footing of 2m width is founded at a depth of 4m below the ground surface. Determine the net ultimate bearing capacity using [8]

(i) Terzaghi's equation

(ii) Skempton's equation.

The soil is clay ($\phi = 0$, $C = 10KN/m^2$). The unit weight of soil is 20KN/m3.
