PVP 14

Code: CE4T2

II B.Tech - II Semester – Regular / Supplementary Examinations
April 2019

GEOTECHNICAL ENGINEERING - I
(CIVIL ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22 M

1.

a) What are different types of soils present in India?
b) What are different phases in soil?
c) What do you mean by plasticity Index?
d) Write the Equation for finding permeability by Variable head method.
e) What is quick sand condition?
f) Write Westergards equation to find vertical stress at a depth under point load.
g) What is Consolidation?
h) Write about differential settlement.
i) What is shear stress and how is it related with Shear Strength parameters?
j) What are the characteristic of Mohr's circle?
k) What is difference between Drained and Un-drained Test?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Explain and discuss the use of Liquidity index, Activity number, Sensitivity and Thixotropy of soil. 8 M

b) (i) A liquid limit test conducted on a soil sample using casagrande apparatus gave the following results: 4 M

No. of blows	10	19	23	27	40
Water content (%)	60	45.20	39.80	36.50	25.20

Two determination of plastic limit gave water content of 20.30% and 20.80%

Determine:

I. the liquid limit and plastic limit
II. the plasticity index
III. the liquidity index if the natural water content is 27.40%
IV. the void ratio at the liquid limit if specific gravity $G_S = 2.7$

ii) A partially saturated soil sample from a borrow pit has a natural moisture content of 15% and bulk unit weight of 1.9 g/c.c. The specific gravity of solids is 2.70. Determine the degree of saturation and void ratio. 4 M

3. a) Explain step by step procedure to classify the soils as per USCS. 8 M

b) (i) What are the factors affecting permeability? 3 M

(ii) Find the ratio of horizontal permeability to vertical permeability for a soil deposit consisting of three layers. The second layer has the permeability ten times that of the first layer and thickness half that of first layer, the third layer has thickness of twice that of first layer and permeability twice that of second layer. 5 M

4. a) A point load of 200 kN acts on the surface of a homogeneous soil mass of large extent find the stress intensity. Use Boussinesq`s equation. 8 M
i) at a depth of 10 m directly under the load
ii) at a horizontal distance of 5m and depth of 10 m.

b) What is seepage and Seepage pressure? A flow net is plotted for a homogeneous earthen dam of 30.0 m height with a free board of 5.0 m. If $K = 6 \times 10^{-4}$ cm/sec, number of flow channels are four, number of potential drops are ten, calculate the discharge per metre run of dam. 8 M

5. a) Write about the objectives of compaction. Explain the term optimum moisture content and how it is influence the compaction? 8 M

b) What is coefficient of consolidation? How many days would be required by a clay stratum of 5 m thick, draining at both ends with coefficient of consolidation = 50×10^{-4} cm^2/sec to attain 50 % of its settlement? (use T50 = 0.197) 8 M

6. a) What are shear strength parameters? Explain about any two tests to be conducted to determine the shear strength parameter of soils with neat sketches. 8 M

b) (i) In unconfined compression test a soil sample fails at 160 kN/m^2 stress. The failure plane makes an angle of 50° with the horizontal. Calculate the values of cohesion and angle of internal friction of the soil. 4 M

(ii) Explain the stress – strain and volume change behaviour of sands. 4 M