PARUL UNIVERSITYs
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Summer 2018 - 19 Examination

Semester: 5   Date: 21/05/2019
Subject Code: 03104305   Time: 10:30 am to 1:00pm
Subject Name: Geotechnical Engineering-II   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions** - (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark)   **(15)**

1. The passive earth pressure of a soil is proportional to (where φ is the angle of friction of the soil)
    (a) $\tan (45° - \varphi)$ (b) $\tan^2 (45° + \varphi/2)$
    (c) $\tan^2 (45° - \varphi/2)$ (d) $\tan (45° + \varphi)$

2. When drainage is permitted in both consolidation as well as shear stage, the test is known as
    (a) UU test   (b) CU test
    (c) CD test   (d) none of these

3. Failure of slope occurs only when total shear force is
    (a) Equal to shear strength   (b) less than shear strength
    (c) greater than shear strength   (d) none of these

4. The equation $\tau = C + \sigma \tan \varphi$ is given by
    (a) Culmann   (b) Rankine
    (c) Coulomb   (d) Terzaghi

5. The length/diameter ratio of cylindrical specimens used in triaxial test, is generally
    (a)   1   (b) 2
    (c) 2.5   (d) 3

6. Define foundation.

7. Write one disadvantage of direct shear test.

8. Write one advantage of triaxial test.

9. Give one example of sampler used to collect disturbed sample of soil.

10. What do u mean by pits and trenches?

11. Define: i) ultimate bearing capacity ii) pile foundation iii) allowable bearing capacity iv) active earth pressure v) sampler

Q.2 Answer the following questions. (Attempt any three)   **(15)**
   A) Differentiate between general and local shear failure.
   B) Discuss the key points of direct shear test.
   C) A cylindrical sample of soil, having cohesion of 0.8 kg/cm^2 and angle of internal friction of 20°, is subjected to a cell pressure of 1 kg/cm^2. Calculate the maximum deviator stress at which the sample will fail.
   D) Describe Mohr- Coloumb method of shear strength of soil.

Q.3 A) Enlist the assumptions made by Rankine's earth pressure theory. Discuss all the cases of active earth pressure for cohesionless backfill given by Rankine.   **(07)**

   B) A retaining wall 4.2 m high with a smooth vertical back retains a dry sandy backfill of unit weight 18 kN/m^3 and angle of shearing resistance of 30^0. the backfill carries a uniformly distributed load of 10 kN/m^2. find by Rankine's theory the total active pressure per metre length of the wall and its point of application above the base.   **(08)**

B) A concentrated point load of 200 kN acts at the ground surface. Find the intensity of vertical **(08)** pressure at a depth of 10 m below the ground surface, and situated on the axis of the loading. What will be the vertical pressure at a point at a depth of 5 m and at a distance of 2 m from the axis of the loading? Use Boussinesq's Analysis.

Q.4 A) A strip footing of width 3 m is founded at a depth of 2 m below the ground level in c-ϕ soil having **(07)** cohesion c= 30 kN/m^2 and angle of internal friction ϕ= 35^0. The unit weight of soil is 17.25 kN/m^3. determine the safe bearing capacity using terzaghi's theory and general shear failure. FOS=3. (Nc=57.8, Nq= 41.4 and Nγ=42.4)

OR

A) Differentiate between disturbed and undisturbed sample of soil. **(07)**

B) Draw the figure of Standard Penetration test and explain its procedure. **(08)**