Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. winter 2019 - 20 Examination

Semester: 5 **Date: 3/12/2019**
Subject Code: 03104305 **Time: 10:30 am to 1:00 pm**
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 active 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 under initially applied normal stress only and full primarily consolidation is allowed to take place, the test is known as
   (a) UU test (b) CU test
   (c) CD test (d) none of these
3. If the failure of a finite slope occurs through the toe, it is known as
   (a) Base failure (b) face failure
   (c) slope failure (d) toe failure
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^o, is subjected to a cell pressure of 1 kg/cm^2. Calculate the maximum deviator stress at which the sample will fail.

D) A concentrated point load of 200 kN acts at the ground surface. Find the intensity of vertical 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 Analysis.

Q.3 A) Describe Standard penetration test in detail. **(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)**

OR

B) Derive the equation of vertical stress due to a concentrated point load given by Boussinesq. Also enlist its assumptions. **(08)**

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 cohesion c= 30 kN/m^2 and angle of internal friction $\phi = 35^0$. 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) **(07)**

OR

A) Explain Swedish circle method (method of slices) for purely cohesive soil. ($\phi = 0$) **(07)**

B) Enlist the assumptions made by Rankine's earth pressure theory. Discuss all the cases of active earth pressure for cohesionless backfill given by Rankine. **(08)**