C.U.SHAH UNIVERSITY
Summer Examination-2019

Subject Name : Geotechnical Engineering - I
Subject Code : 4TE05GTE1   **Branch: B.Tech (Civil)**
Semester : 5   Date : 19/03/2019   Time :10:30 To 01:30   Marks : 70

Instructions:
(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1   Attempt the following questions: **(14)**

a)	Give the applications of soil engineering.	1
b)	Name the types of soil transportation.	1
c)	Define permeability of soil.	1
d)	What is the problem with black cotton soil as the foundation material?	1
e)	Define consolidation of soil.	1
f)	What is loam soil?	1
g)	Define bulk density of soil.	1
h)	Which test gives dry density of soil?	1
i)	If the volume of voids is equal to the volume of soil solids, then the porosity and void ratio are _____.	1
j)	If the consistency index of soil is zero, then the soil is _____.	1
k)	Give the relation between coefficient of percolation and coefficient of permeability.	1
l)	Explain quick sand condition of soil.	1
m)	Settlement of soil under compressive force due to expulsion of water from pores is known as _____.	1
n)	According to coulomb's law, the shearing strength of soil is _____.	1

Attempt any four questions from Q-2 to Q-8

Q-2   Attempt all questions   **(14)**
a)   Explain the IS soil classification system. Draw the chart showing soil classification.   8
b)   Write a note on characteristics of different type of soils.   6

Q-3   Attempt all questions   **(14)**
a)   Explain the structure of soils.   7

b) Explain the type of clay minerals. 7

Q-4 Attempt all questions **(14)**

a) Sieve analysis was carried out on a soil sample of 1kg. The weight retained on each sieve is shown in table. Draw the particle size distribution curve. 7

Sieve size	Weight retained (gm)
10mm	85
4.75mm	98
2mm	165
1mm	158
600micron	140
425micron	128
200micron	65
150micron	40
75micron	40
Pan	81

b) Write a note on particle size distribution curve. 7

Q-5 Attempt all questions **(14)**

a) Prove that, $\gamma = \frac{\gamma_w (G+S.e)}{1+e}$; $\gamma_{sub} = \gamma_w \left[\frac{G-1}{1+e}\right]$ 7

b) Explain the experiment for determination of liquid limit of soil. 7

Q-6 Attempt all questions **(14)**

a) Write a note on activity and sensitivity of soils. 7

b) Two soils S_A & S_B are tested in laboratory for the consistency limits. The results are as below: 7

	Soil - A	Soil - B
ω_p	20%	22%
ω_l	40%	58%
I_f	11	6
ω	41%	48%

    i. Which soil is more plastic?
    ii. Which soil is better foundation material when remoulded?
    iii. Which soil has better strength as function of water content?
    iv. Which soil has better strength at plastic limit?

Q-7 Attempt all questions **(14)**

a) Explain the field permeabilty tests. 7

b) A pervious sandy layer 20m thick overlies an impervious stratum. The water table lies at a depth of 3m below the ground surface. Water is pumped out at the rate of 7

150lit/s. Water levels in two observation wells at a radial distance of 4m and 20m drops down by 5m and 3m respectively. Determine coefficient of permeability.

Q-8 Attempt all questions   **(14)**
  a) Explain permeability of stratified soil deposits.   7
  b) Explain the types of consolidation of soil.   7