

Enrollment No: \_\_\_\_\_

Exam Seat No: \_\_\_\_\_

# C. U. SHAH UNIVERSITY

## Winter Examination-2022

Subject Name: Geotechnical Engineering - I

Subject Code: 4TE05GTE1

Branch: B.Tech (Civil)

Semester: 5

Date: 24/11/2022

Time: 02:30 To 05:30

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.

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<b>Q-1</b>	<b>Define the terms:</b>	<b>(14)</b>
	a) Alluvial Soil	1
	b) Lacustrine Soil	1
	c) Marine Soil	1
	d) Aeoline Soil	1
	e) Glacial Soil	1
	f) Colluvial Soil	1
	g) Humus	1
	h) Loam	1
	i) Clay	1
	j) Moorum	1
	k) Degree of Saturation	1
	l) Permeability	1
	m) Compaction	1
	n) Shear Strength of Soil	1

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

<b>Q-2</b>	<b>Attempt all questions</b>	<b>(14)</b>
<b>A</b>	What is the scope of geotechnical engineering in the field of civil engineering?	<b>07</b>
<b>B</b>	Explain soil formation in geological cycle.	<b>07</b>
<b>Q-3</b>	<b>Attempt all questions</b>	<b>(14)</b>
<b>A</b>	Explain three phase diagrams of soil.	<b>07</b>
<b>B</b>	The percentage voids in soil sample are 30%. If maximum and minimum dry density of soil sample are 2.0 gm/cc and 1.5 gm/cc respectively. Determine density index of soil, when specific gravity of soil is 2.4.	<b>07</b>
<b>Q-4</b>	<b>Attempt all questions</b>	<b>(14)</b>
<b>A</b>	Give the difference between coarse grained soil and fine-grained soil.	<b>07</b>
<b>B</b>	Define the following: (1) Water Content (2) Bulk Density (3) Dry	<b>07</b>



Density (4) Saturated Density (5) Submerged Density (6) Void Ratio (7) Porosity.

- Q-5**      **Attempt all questions**      **(14)**
- A**      Determine the time  $t$  required in minutes for particles of diameter 0.2 mm to fall a height of 10 cm from surface in the water. Take  $G = 2.65$ ,  $\mu = 8.15 \times 10^{-3}$  Poise.      **07**
- B**      What are different types of soil structures which can occur in nature? Describe in brief.      **07**
- Q-6**      **Attempt all questions**      **(14)**
- A**      A soil sample has a liquid limit of 25%, plastic limit of 15% and flow index of 12.5%. natural water content of soil is 20%. Determine: (1) Plasticity Index (2) Liquidity Index (3) Consistency Index (4) Toughness Index.      **07**
- B**      Classify the soil with the following properties as per IS classification system: % Passing 4.75 mm sieve = 60%, % Passing 75-micron sieve = 45%, Liquid Limit = 40%, Plasticity Index = 10%.      **07**
- Q-7**      **Attempt all questions**      **(14)**
- A**      Discuss field identification methods for fine grained soils.      **07**
- B**      State and explain factors affecting permeability.      **07**
- Q-8**      **Attempt all questions**      **(14)**
- A**      Describe direct shear test. What is its limitation?      **07**
- B**      Describe the Spring Analogy Theory for primary consolidation.      **07**

