Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– V (New) EXAMINATION – WINTER 2019

Subject Code: 2154003 **Date: 25/11/2019**

Subject Name: Geotechnical Engineering - I

Time: 10:30 AM TO 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Semi-log papers & Arithmetic graph papers can be requested from the invigilator.**

MARKS

Q.1 **(a)** Discuss three phases system of soil. Explain with neat sketch. **03**

(b) Derive : $e = \frac{n}{1-n}$ **04**

(c) Summarize the Scope and limitation of geo-technical engineering in civil engineering. **07**

Q.2 **(a)** Define: Water Content, Bulk Density, Dry Density **03**

(b) For a soil sample, particle size distribution curve was obtained and value of D_{10} = 0.145, D_{30} =0.47, D_{60} =1.5. Classify the soil. **04**

(c) For following results, plot particle size distribution curve and classify the soil. **07**

Total weight of soil sample = 500 g

Sieve Size	4.75 mm	2.36 mm	1.18 mm	600 µ	300 µ	150 µ	75 µ
Soil Passing (%)	95	87	68	49	29	12	4

OR

(c) Describe any test to obtain specific gravity of soil with sketch. **07**

Q.3 **(a)** Define: Liquid limit, Plastic Limit & Shrinkage Limit **03**

(b) Discuss the uses of Consistency limits. **04**

(c) Explain liquid limit test for soil by Casagrande method. **07**

OR

Q.3 **(a)** Draw a neat sketch for the consistency limits as proposed by Atterberg. **03**

(b) Define: Toughness Index, Plasticity Index, Shrinkage Index, Liquidity Index, Sensitivity (Any 4) **04**

(c) Illustrate liquid limit test for soil by Cone penetrometer method. **07**

Q.4	**(a)**	What is Permeability of soil? Discuss importance of permeability in soil.	**03**
	(b)	In a falling head permeability test on a sample 18 cm high and 44 cm^2 in cross sectional area, the water level in a standpipe of 6.25 mm internal diameter dropped from a height of 70 cm to 28 cm in 10 minutes. Determine the coefficient of permeability.	**04**
	(c)	Explain the most suitable test to determine Permeability of Sandy soil in laboratory.	**07**

OR

Q.4	**(a)**	What are the applications of Flow net?	**03**
	(b)	State Darcy's law. What are the assumptions made in Darcy's law?	**04**
	(c)	Discuss the different factors affecting permeability of soil.	**07**
Q.5	**(a)**	Enlist the various factors affecting compaction.	**03**
	(b)	What are the differences between compaction and consolidation?	**04**
	(c)	Explain Mohr strength theory and Mohr-coulomb's strength theory.	**07**

OR

Q.5	**(a)**	What is Consolidation?	**03**
	(b)	Compare Light compaction and Heavy compaction Test of soil.	**04**
	(c)	Explain Standard Proctor Test as per IS 2720 (Part 7), 1980.	**07**

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