Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (NEW) EXAMINATION – WINTER 2021

Subject Code:3130606 Date:17-02-2022

Subject Name:Geotechnical Engineering

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. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain the purposes of the soil classification	**03**
	(b)	What is the scope of geotechnical engineering in the various domain of civil Engineering?	**04**
	(c)	Explain three phase of soil. Also write note on soil formation in Geological cycle. (with sketch)	**07**
Q.2	**(a)**	Explain particle size distribution and its application.	**03**
	(b)	Define the following terms: (i) water content (ii) void ratio (iii) porosity (iv) degree of saturation (v) specific gravity	**04**
	(c)	Define consistency of soil? Explain with sketch various methods to determine it.	**07**

OR

	(c)	An undisturbed soil sample has total weight of 2060 gm, volume of 1200 cc, water content = 11% and specific gravity G = 2.68. Compute (i) void ratio (ii) porosity (iii) degree of saturation (iv) water content to make sample fully saturated and (v) effective unit weight of the soil sample.	**07**

Q.3	**(a)**	Distinguish between free water and held water.	**03**
	(b)	Differentiate between light compaction test and heavy compaction test.	**04**
	(c)	The following results were obtained in a standard compaction test on a soil sample.	**07**

Water content %	5	10	20	14	25
Bulk unit weight kN/m^3	17.7	19.8	21.0	21.8	21.6

Determine the OMC and MDD of this soil. Also calculate water necessary to completely saturated the sample at its maximum dry unit weight assuming no change in volume take G = 2.7

OR

Q.3	**(a)**	Difference between shallow and deep foundation	**03**
	(b)	Explain briefly each factor affecting permeability of soils.	**04**
	(c)	Define with sketch Flow net. Its characteristics and its application.	**07**

Q.4	**(a)**	Discuss briefly, different types of slope failures.	**03**
	(b)	Enlist factor affecting the bearing capacity and explain any two in detail	**04**
	(c)	Define Safe, Allowable and Ultimate bearing capacity of soil. Write down Terzaghi's bearing capacity equation, its assumption and limitation of analysis.	**07**
		OR	
Q.4	**(a)**	Define Coefficient of compressibility, Coefficient of Volume change, Compression Index.	**03**
	(b)	Differentiate between the process of consolidation and compaction.	**04**
	(c)	Enlist the three standard triaxial shear tests with respect to drainage conditions? Explain with reasons the situations for which each test is to be preferred.	**07**
Q.5	**(a)**	Differentiate between active and passive earth pressure with relevant examples.	**03**
	(b)	Explain Modified Mohr Coulomb failure theory for shear strength? Sketch typical strength envelop for different type of soil.	**04**
	(c)	Explain plate load test with neat sketches. It's application.	**07**
		OR	
Q.5	**(a)**	Explain with nest sketch working principle of Vane shear test.	**03**
	(b)	Differentiate between General shear failure and Local shear failure with neat sketch	**04**
	(c)	Explain Newmark's Chart and its application.	**07**

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