

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III(NEW) EXAMINATION – SUMMER 2023****Subject Code:3130606****Date:24-07-2023****Subject Name:Geotechnical Engineering****Time:02:30 PM TO 05:00 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 briefly with diagram Geological Cycle.	03
	(b) What is the scope of geotechnical engineering in the field of civil Engineering?	04
	(c) Define the following terms: (i) water content (ii) void ratio (iii) porosity (iv) Unit weight of solids (v) Air content(vi) Bulk Unit weight (vii) Specific gravity	07
Q.2	(a) Explain the purposes of the soil classification	03
	(b) Explain the various factors affecting compaction.	04
	(c) Explain the grain size distribution by using sieve analysis method in details and its outcomes. How to determine C_c and C_u ?	07
OR		
	(c) An undisturbed soil sample has total weight of 2060 gm, volume of 1200cc. 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 weight of soil sample	07
Q.3	(a) Differentiate between standard proctor and modified proctor test.	03
	(b) Explain briefly each factor affecting permeability of soils.	04
	(c) Define with sketch Flow Net. Its characteristics and its application.	07
OR		
Q.3	(a) Differentiate between the process of consolidation and compaction.	03
	(b) Enlist different methods for classification of soil. Explain any one in detail.	04

- (c) The following are data from laboratory light compaction Determine MDD and OMC by drawing compaction graph. 07

Water Content (%)	Bulk Density (g/cc)
17.5	1.87
19.0	1.95
20.0	1.97
21.0	1.98
22.0	1.99
22.5	1.97
24.0	1.96

- Q.4 (a) Differentiate between active and passive earth pressure with relevant examples. 03
- (b) Differentiate between General shear failure and Local shear failure with neat sketch. 04
- (c) Explain Newmark's Chart and its application. 07

OR

- Q.4 (a) Define term consolidation Explain with sketch Terzaghi's One Dimensional Consolidation using Spring Analogy 03
- (b) What is Mohr's Coulomb's shear strength theory? Sketch typical strength envelope for a clean sand 04
- (c) What are 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) 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.5 (a) Write critically note on Pile classification 03
- (b) Explain plate load test with neat sketches. It's application. 04
- (c) Briefly explain Direct Shear Box and Triaxial Test. 07