Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (NEW) EXAMINATION – SUMMER 2022

Subject Code:3130606 **Date:11-07-2022**

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)	Differentiate between flocculated and honey comb structure.	04
	(c)	Describe the method of liquid limit of soil by Casagrande method.	07
Q.2	(a)	Distinguish between light compaction and heavy compaction.	03
	(b)	Explain the various factors affecting compaction.	04
	(c)	Enlist and explain any one method of compaction.	07
		OR	
	(c)	What is particle size distribution curve? What is its use in soil engineering?	
Q.3	(a)	Explain briefly each factor affecting permeability of soils	03
	(b)	Explain in detail the construction of Newmark's influence chart	04
	(c)	Define with sketch Flow net. Its characteristics and its application.	07
		OR	
Q.3	(a)	Define finite and infinite slopes with example.	03
	(b)	Discuss briefly, different types of slope failures.	04
	(c)	Derive an expression for the factor of safety of an infinite slope in a cohesionless soil. What is the effect of steady seepage parallel to the slope on a stability?	07
Q.4	(a)	What is Mohr's strength theory for soils? Sketch typical strength envelop for a clean sand.	03
	(b)	Draw Coulomb's failure envelop for sandy soil, clay soil and mix soil.	04
	(c)	Describe direct shear test. What are the advantages of this test? What are its limitations?	07
		OR	
Q.4	(a)	Distinguish between 'active' and 'passive' earth pressure.	03
	(b)	A retaining wall 6m height with vertical back supports cohesive soil backfill having unit weight 20 kN/m^3 and angle of internal friction as zero. Calculate i) Internal Pressure intensity at top ii) Depth of tension crack iii) Lateral pressure intensity at the base.	04
	(c)	Explain Culmann's graphical methods for active earth pressure.	07
Q.5	(a)	Define consolidation. What are its causes?	03
	(b)	Define the terms: i) Compression index ii) Coefficient of volume change iii) Coefficient of compressibility Also indicate their units and symbols	04

	(c)	In a laboratory a 2 cm thick soil sample takes 25 minutes to reach 30% degree of consolidation. Find the time required for a 5 m thick clay layer in the field to reach 40 % consolidation. Assume double drainage in both the cases.	**07**

OR

Q.5	**(a)**	Enlist factor affecting the bearing capacity and explain any two in detail.	**03**
	(b)	Explain type of shear failure of soil with net sketch.	**04**
	(c)	Define Safe, Allowable and Ultimate bearing capacity of soil. Write down Taraghi's bearing capacity equation, its assumption and limitation of analysis.	**07**

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