Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2023

Subject Code:3150615 Date:13-12-2023

Subject Name:Soil Mechanics

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 Bore log in detail. Its prediction used in soil exploration.	**03**
	(b)	Define soil exploration and its objectives. Explain the stages of Site Investigations.	**04**
	(c)	Enlist the various methods of Exploration? Explain any one in detail with sketch.	**07**
Q.2	**(a)**	Difference between Flexible and Rigid pavements	**03**
	(b)	Differentiate between General shear failure and Local shear failure with neat sketch.	**04**
	(c)	A square pile group of 9 piles passes through a recently filled up material of 4 m depth. The diameter of the pile is 0.3 m and pile spacing is0.9m center to center. If the UCS of soil is 60 kN/m^2 and unit weight is 15 kN/m^3**.** Compute the negative skin friction.	**07**
		OR	
	(c)	Determine ultimate bearing capacity using Terzaghi's theory. A strip footing 1.5m wide resting on a saturated clay at a depth 2m below ground level. (Ø = 0, $\gamma_{sat.}$ = 20 kN/m^3, C = 30 kN/m^2) The water table is also at a depth of 2m from the ground level. If the water table rise by 1m. Calculate the reduction in ultimate bearing capacity.	**07**
Q.3	**(a)**	Write the assumption and limitations of Terzaghi's Bearing capacity theory.	**03**
	(b)	Define Following: 1. Gross pressure intensity 2. Ultimate bearing capacity 3. Safe bearing Capacity 4. Allowable bearing Capacity	**04**
	(c)	Explain with neat sketch **SPT** in detail – its working principle, corrections applied	**07**
		OR	
Q.3	**(a)**	Name and explain the shear tests which may be performed based on the different drainage conditions.	**03**
	(b)	Explain importance of 'Unconfined Compression Test'& 'Laboratory Vane Shear Test'.	**04**
	(c)	Describe different types of Geosynthetics and its application with sketch in various domain of civil engineering.	**07**
Q.4	**(a)**	Enlist various classification of pile.	**03**

	(b)	Explain in detail "Under Reamed Pile Foundation".	**04**
	(c)	Write procedure for estimate the group capacity of piles in sand. Also explain negative skin friction and its effects on the pile?	**07**

OR

Q.4	**(a)**	Briefly explain with sketch Boussinesq's equation.	**03**
	(b)	Explain how the water table effects on bearing capacity.	**04**
	(c)	Explain Swedish circle method of stability analysis	**07**
Q.5	**(a)**	Discuss various types of slope failures	**03**
	(b)	Differentiate the Infinite and finite slope.	**04**
	(c)	Critically explain factors affecting bearing capacity in detail with sketch.	**07**

OR

Q.5	**(a)**	Elaborate the conditions where a pile foundation is more suitable than a shallow foundation.	**03**
	(b)	Explain the concept of Pressure Bulb with neat sketches.	**04**
	(c)	Explain in detail Plate load test with neat sketch. Its importance and out puts from this test.	**07**

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