Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI EXAMINATION – SUMMER 2025

Subject Code: 3160616 Date:02-06-2025

Subject Name: Foundation 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)**	State the objectives of reconnaissance survey for exploration of soil.	**03**
	(b)	Describe hydrometer test	**04**
	(c)	Enlist different types of borings for soil exploration of soil and describe any one in detail.	**07**
Q.2	**(a)**	Discuss area ratio, inside clearance, outside clearance with respect to disturbed and undisturbed sample.	**03**
	(b)	Plan the exploration program for projects with following details. Area of plot 6000 m^2 with almost square in shape. There will be 5 high-rise residential frame structure with G + 10.	**04**
	(c)	Describe standard penetration test with necessary corrections.	**07**
		OR	
	(c)	Describe wash boring for sub surface exploration.	**07**
Q.3	**(a)**	Illustrate the water table effects to the bearing capacity of soil with sketch.	**03**
	(b)	Describe general shear failure with sketch.	**04**
	(c)	Determine the safe bearing capacity of the 1.5 m wide strip footing placed at the depth of 1.2 m, in homogeneous sand. The soil properties are C = 0, γ = 18 kN/m^3, Ø = 35°. Take bearing capacity factor N_c, 57.8, = Nq = 41.4, and Nγ =42.4 and Factor of safety 2.5.	**07**
		OR	
Q.3	**(a)**	State Terzaghi's assumptions for bearing capacity analysis.	**03**
	(b)	Describe punching shear failure with sketch.	**04**
	(c)	Plate tests were conducted in C – Ø soil, on plates of two different sizes and the following results were obtained. Find the size of square footing to carry load of 1000 kN at same settlement.	**07**

Load	Size of footings	Settlement
40 kN	0.3 x 0.3 m	25 mm
100 kN	0.6 x 0.6 m	25 mm

Q.4	**(a)**	Differentiate between cast in situ and driven pile.	**03**
	(b)	Describe negative skin friction on pile.	**04**
	(c)	A concrete pile 30 cm in diameter is driven into a medium sand dense sand up to 8 .0 m depth. Estimate the safe load on pile with factor of safety 2.5. Take γ= 21 kN/m^3, K = 1.0, tanδ = 0.70 and critical depth 3 m and Nq = 80.	**07**
		OR	
Q.4	**(a)**	Describe compaction pile with its application.	**03**

	(b)	State the Feld's rule for group efficiency of pile and explain in detail with sketch.	**04**
	(c)	A pile group consists of 9 pile of 300 mm diameter arraigned in 3 x 3 pattern. The center-to-center distance between piles are 750 mm. The depth of pile is 10 m. The soil is having cohesion 80 kN/m^2.	**07**
Q.5	**(a)**	Draw contact pressure diagram for flexible foundation on clay and sand.	**03**
	(b)	State the measures taken to rest foundation in expansive soil.	**04**
	(c)	State the application of Geomembrane in the civil engineering.	**07**

OR

Q.5	**(a)**	Draw contact pressure diagram for rigid foundation on clay and sand.	**03**
	(b)	Differentiate between counter fort wall and cantilever type retaining wall.	**04**
	(c)	State the application of Geogrid in the civil engineering.	**07**

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