Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–VI (NEW) EXAMINATION – WINTER 2024

Subject Code:3160616 Date:09-12-2024

Subject Name:Foundation 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)**	Provide information obtained in Reconnaissance survey.	**03**
	(b)	Enlist directs methods of exploration and explain Pits and Trench in brief.	**04**
	(c)	Illustrate wash boring method of exploration with neat sketch.	**07**
Q.2	**(a)**	Explain Dilatancy and Overburden pressure for SPT test.	**03**
	(b)	State the measures to be taken for treatment of expansive soil.	**04**
	(c)	Enlist different conditions for Combined footing and discus any one in detail.	**07**
		OR	
	(c)	Describe Grillage foundation.	**07**
Q.3	**(a)**	Enlist different foundation for Expansive soil and describe anyone.	**03**
	(b)	Differentiate between Counterfort and Cantilever type of retaining wall.	**04**
	(c)	Describe Geogrids with their application.	**07**
		OR	
Q.3	**(a)**	Enlist minerals available in clayey soil and describe Montmorillonite.	**03**
	(b)	Enlist various forces acting on Gravity type retaining wall with its effect on stability.	**04**
	(c)	Describe Geomembrane with its application.	**07**
Q.4	**(a)**	State the Skempton's theory for cohesive soil.	**03**
	(b)	Differentiate between local and punching shear failure.	**04**
	(c)	A 1.5 m wide strip footing is placed at a depth of 1.2m in cohesionless soil. The water table is at 1.2 m. Determine safe bearing capacity with FOS 3. Take $\gamma = 17$ kN/m^3, $\gamma_{sat} = 19$ kN/m^3, and $Ø = 30°$, $N_c = 37.2$, $N_q = 22.5$, $N_\gamma = 19.7$.	**07**
		OR	
Q.4	**(a)**	State the bearing capacity equation given by IS 6403-1981, with details of each term.	**03**
	(b)	Enlist the assumptions made by Terzaghi in bearing capacity theory.	**04**
	(c)	Plate load tests were conducted in c – Ø soil, on plates of two different sizes and following results were obtained. Find the size of square footing to carry a load of 800 kN.	**07**

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

Q.5	**(a)**	Describe Displacement and Non-displacement Pile.	**03**
	(b)	Differentiate between End bearing and Friction Pile.	**04**
	(c)	A group of 3 X 3 piles 10 m long, and 300 mm diameter is used as foundation. The soil is having cohesion 70 kN/m^2, adhesion factor 0.75. The spacing among the piles 800 mm. Calculate safe load of pile group with FOS 3.	**07**

OR

Q.5	**(a)**	State the objectives of Sheet Pile.	**03**
	(b)	Describe Under- Reamed pile.	**04**
	(c)	A 15 m long 350 mm diameter pile is placed in dense sand. Determine the load carrying capacity of pile with FOS 3. Take Take γ = 17 kN/m^3, and Ø = 40°, N_q = 135, K = 2.0, tanδ= 0.57. Take D_c = 20B.	**07**

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