Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– VI (NEW) EXAMINATION – WINTER 2021

Subject Code:3160616 Date:02/12/2021

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)**	Write down different methods of exploration with details.	**03**
	(b)	Write Short note on Grillage Foundation.	**04**
	(c)	Describe with a neat sketch wash boring method of sub soil exploration. What are its merits and demerits?	**07**
Q.2	**(a)**	Define following terms (i) Ultimate bearing capacity (ii) Net safe bearing capacity (iii) Allowable bearing pressure	**03**
	(b)	Differentiate between Disturbed soil sample and Undisturbed soil sample.	**04**
	(c)	Enlist the different geophysical method. Explain any one in detail with its limitations.	**07**
		OR	
	(c)	Determine the ultimate bearing capacity of a strip footing 1.2 m wide resting on a saturated soil (cu = 35 kN/m^2, Øu= 0, and γsat=19 kN/m^3) at a depth of 1.5 m below ground level. The water table is also at a depth of 1.5 m from ground level. (Use terzaghi's theory). Also find net ultimate and net safe bearing capacity. Take FOS= 3. (Nc= 5.70, Nq=1.0, Nγ= 0)	**07**
Q.3	**(a)**	Explain various methods to reduce foundation settlement.	**03**
	(b)	Discuss the various factor affecting the sample disturbance.	**04**
	(c)	Describe plate load test with neat sketch.	**07**
		OR	
Q.3	**(a)**	Draw the sketch of Split spoon sampler with all details.	**03**
	(b)	Define Contact pressure. Draw contact pressure diagram for rigid footing on clay and sand.	**04**
	(c)	Compute the safe bearing capacity of a square footing of 1.8 m x 1.8 m located at a depth of 1.5 m below ground level in a soil of density 18 kN/m3, Ø= 38, (Nc= 35.50, Nq=23.2 , Nγ= 22.0) if the water table rises to the ground level, what is reduction in SBC, Take FOS= 3.	**07**
Q.4	**(a)**	Distinguish between Displacement pile and Non displacement pile.	**03**
	(b)	Explain Feld's rule for group efficiency of piles. Determine the efficiency of group of nine piles (3x3) by Feld's rule.	**04**
	(c)	An RCC pile of 12 m overall length is driven into a deep stratum of soft clay having an unconfined compressive strength of 40 kN/m2.The	**07**

diameter of pile is 35 cm. Determine the safe load that can be carried by the pile with a factor of safety = 3. $\alpha = 0.95$.

OR

Q.4	**(a)**	Enlist various dynamic formulae for pile capacity with their limitations.	**03**
	(b)	Write short note on group action and efficiency of pile group.	**04**
	(c)	A square concrete pile of 30 cm x 30 cm is driven in to homogeneous sand layer, (Ø= 30, and γ=19 kN/m^3) for a depth of 10 m . Calculate the ultimate load. Take k= 1.3, $\delta = 20^0$ and Nq = 29 for Ø= 30)	**07**
Q.5	**(a)**	Explain different foundations systems of expansive soils.	**03**
	(b)	Give basic difference between Cantilever retaining wall and Counterfort retaining wall.	**04**
	(c)	Describe various methods for treatment of collapsible soils.	**07**

OR

Q.5	**(a)**	What is sheet pile wall? Describe types of sheet pile wall.	**03**
	(b)	Explain in detail various uses of geosynthetics.	**04**
	(c)	Write Short note on soldier piles and lagging with neat sketch.	**07**

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