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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Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3160616 Date:14/06/2022

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)**	Enumerate the factors affecting bearing capacity.	**03**
	(b)	Define bearing capacity, gross bearing capacity and net bearing capacity.	**04**
	(c)	Classify the methods of sub-soil exploration and explain in detail Augur boring method.	**07**
Q.2	**(a)**	Differentiate between general shear failure and local shear failure.	**03**
	(b)	Explain about floating foundation with neat sketch..	**04**
	(c)	Determine the safe bearing capacity of a strip footing 2 m wide and 1.5 m depth resting on a dry sand bed. Consider γsand=17.5 kN/m3 and bearing capacity factors Nc= 35.5 Nq= 24.2 , Nγ = 21.0 corresponding to $\phi=37^0$ and FOS=3.	**07**
		OR	
	(c)	Describe plate load test with neat sketches.	**07**
Q.3	**(a)**	Discuss Various correction required in SPT test.	**03**
	(b)	Explain Electrical resistivity method in details.	**04**
	(c)	Determine the area ratio , inside clearance and outside clearance for the following soil samplers and comment on the nature of the samples obtained. (i) Core edge : 77 mm outer & 70 mm inner diameter. (ii) Samping tube: 74 mm outer & 72 mm inner diameter	**07**
		OR	
Q.3	**(a)**	Enlist the various method of pile driving equipment.	**03**
	(b)	Define negative skin friction. What is its effect on the pile?	**04**
	(c)	Explain different function of geo-synthetics in detail with figures.	**07**
Q.4	**(a)**	Explain group action of pile	**03**
	(b)	Write Short note on Under reamed pile.	**04**
	(c)	A square concrete pile 40 cm x 40 cm is driven in to homogeneous sand layer, (ϕ=35, γ=17 kN/m3,) for a depth of 15m. calculate ultimate load . take K= 1.3 and $\delta= 18^0$, Nq=51	**07**
		OR	
Q.4	**(a)**	Explain concept of CNS layer.	**03**
	(b)	Describe Hiley's formula for calculating the ultimate bearing capacity of pile.	**04**
	(c)	Discuss the various types of anchors used for sheet pile wall.	**07**

Q.5	**(a)**	Explain seismic refraction method in details.	**03**
	(b)	Give basic difference between Cantilever and Counter fort retaining wall.	**04**
	(c)	A drop hammer weighing 60 kN and having an effective fall of 0.75m drives an RCC pile weighing 40 kN. The average settlement per blow is 1.6cm. The total temporary elastic compression is 2.0 cm. Determine ultimate bearing capacity and allowable load on pile assuming coefficient of restitution as 0.30 and factor of safety 2.5. Use Hiley's formula.	**07**

OR

Q.5	**(a)**	Discuss the Sheet pile? where it is used?	**03**
	(b)	Write short note on "Guide walls".	**04**
	(c)	What is the "active zone" in black cotton soil? Explain the properties of black cotton soil.	**07**

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