

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VIII (New) EXAMINATION – WINTER 2019****Subject Code: 2180609****Date: 27/11/2019****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.

		MARKS
Q.1	(a) Define following; Bearing capacity, Shallow foundation, Allowable soil pressure	03
	(b) What do you understand by disturbed and undisturbed soil samples? How can you obtain disturbed soil samples?	04
	(c) Define footing and foundation. Explain the factors that affect the selection of type of foundation.	07
Q.2	(a) Which are the favorable conditions for a mat/raft foundation?	03
	(b) Explain the typical characteristics of general shear failure and local shear failure.	04
	(c) List out the in-situ penetration tests. Explain any one in detail with neat sketch.	07
	OR	
	(c) A strip footing 2 m wide carries a load intensity of 400 kN/m ² at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m ³ and unit weight above water table is 16.8 kN/m ³ . The shear strength parameters are $c = 0$ and $\phi = 35^\circ$. Determine the factor of safety with respect to shear failure for the following cases, using Terzaghi's bearing capacity equation; (a) Water table is 1.2 m below GL (b) Water table at GL itself. Adopt $N_c = 57.8$, $N_q = 41.4$ and $N_\gamma = 42.4$	07
Q.3	(a) What are the assumptions made in the derivation of Terzaghi's bearing capacity theory? Write the equation for the ultimate bearing capacity.	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) Enlist different types of retaining walls. Explain any three with neat sketches showing all important elements.	07
	OR	
Q.3	(a) Describe the corrections required to N-value obtained from standard penetration test.	03
	(b) Classify the piles on the basis of their function with sketches.	04
	(c) Discuss stability criteria of cantilever retaining wall.	07
Q.4	(a) Write full form of CNS layer. Explain concept of CNS layer.	03
	(b) Enlist different pile driving hammers. Explain any two in detail.	04
	(c) A group of 16 piles of 0.6 m diameter is arranged in a square pattern with centre to centre spacing of 1.2 m. The piles are 10 m long and embedded in soft clay with cohesion 30 kN/m ² . Bearing resistance	07

may be neglected for the piles. Adhesion factor is 0.6. Determine the ultimate load capacity of pile group.

OR

- Q.4** (a) Discuss the characteristics of the expansive soils. **03**
(b) Define negative skin friction. What is its effect on the pile? **04**
(c) Explain detail procedure of pile load test with figure showing entire test setup. **07**

- Q.5** (a) Which are the forces acting on retaining wall? **03**
(b) Describe swelling potential and swelling pressure. **04**
(c) Explain in detail various applications of geosynthetics. **07**

OR

- Q.5** (a) Differentiate between gravity retaining wall and counterfort retaining wall. **03**
(b) What is 'active zone' in black cotton soil? State properties of black cotton soil. **04**
(c) Classify geotextile materials. What are the basic functions performed by geotextiles? **07**

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