Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC SEMESTER V– EXAMINATION – SUMMER 2017

Subject Code: X50603 **Date: 04/05/2017**

Subject Name: Foundation Engineering

Time: 02.30PM to 05.00PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	List the types of foundations & footings. Explain each for its suitability & functional requirement.	**07**
	(b)	Explain the interpretation & limitations of plate load test.	**07**
Q.2	**(a)**	(i) State the assumptions of Terzaghi's bearing capacity theory. (ii) Explain with neat sketches various zones in Terzaghi bearing capacity analysis.	**07**
	(b)	(i) Differentiate between: General shear failure and Local shear failure. (ii) Explain the terms: area ratio and recovery ratio.	**07**
		OR	
	(b)	A 2 m size square footing is supported by granular soil at 1.5m depth below existing ground surface. Using Terzaghi equation, determine safe bearing capacity for footing if water table is at the base of footing. Soil properties are $\gamma = 18$ kN/m^3, $\Phi = 38^o$, Nq= 65.34, $N\gamma = 77.20$, F.S. = 2.0.	**07**
Q.3	**(a)**	Differentiate between bored piles and cast in situ pile with their utility. And Explain with neat sketch the function of following type of pile. (i) Friction pile (ii) Batter pile.	**07**
	(b)	A square footing fails by general shear in a cohesion less soil under an ultimate load of Qd = 7500kN. The footing is placed at a depth of 2 meter below ground surface. Given $\Phi = 38^o$ and $\gamma = 18$ kN/m^3, determine the size of the footing if the water table is at great depth.	**07**
		OR	
Q.3	**(a)**	(i) What are the conditions where pile foundation is more suitable than a shallow foundation? (ii) Discuss various dynamic formulas for estimating pile capacity. What are their limitations?	**07**
	(b)	A concrete pile, 30 cm diameter is driven into medium dense sand for a depth of 8m. The soil properties are Ø=30º, $\gamma = 17$ kN/m^3, K=1.0 & $\tan\delta = 0.70$. Estimate the safe load taking a factor of safety 2.5. , N_q=21.0	**07**
Q.4	**(a)**	What is a boring log? Draw a typical bore log & discuss its utility.	**07**
	(b)	Explain in brief Objectives of exploration and planning of exploration program.	**07**
		OR	
Q.4	**(a)**	Mention the types & advantages raft foundation	**07**
	(b)	Explain how the group efficiency of pile can be calculated?	**07**
Q.5	**(a)**	Explain negative skin friction. In which condition it occurs?	**07**

(b) A pile load test is made on a 350mm dia. test pile & following data are obtained. **07**

Load (kN) :	0	300	450	600	750	1000	1250
Settlement (mm) :	0	1.20	2.75	4.50	9.25	12.5	16.00

Determine the design load on pile considering the settlement & shear criteria.
F.S.=3.0

OR

Q.5 **(a)** How the foundation is carried in expansive soil? **07**

(b) How the expansive soil can be identified? Discuss the characteristics of expansive soil. **07**

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