Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VIII (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2180609 **Date: 29/04/2017**

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.**

			MARKS
Q.1		**Short Questions: Fill in the blanks**	**14**
	1	The standard penetration test is used to measure the shear strength of _____ (clay, sands)	
	2	In standard penetration test the weight of _____ kg. and _____ cm free fall is Considered. (75 & 65, 65 & 75).	
	3	Likelihood of general shear failure for an isolated footing in sand decrees with increase in footing width. _____(True, false)	
	4	The two criteria for the determination of allowable bearing capacity of foundation are _____ & _____. (Shear failure & settlement, bond failure & shear failure)	
	5	In a plate load test, the ultimate load is estimated _____ from the load settlement log–log graph. (directly, by the secant method)	
	6	The negative skin friction on a pile is developed when _____ (The soil surrounding pile settles more, The ground water table rises)	
	7	According to Field's rule, the efficiency of group of three piles in a triangular pattern is _____ (87.5%, 82%)	
	8	The main function of geo-membrane is as _____ (liquid barrier, reinforcement)	
	9	The swelling behavior of black cotton soil is attributed to presence of _____ (Kaolin, Montmorillonite)	
	10	In a counterfort retaining wall, the counterfort acts as a _____ (tension member, compression member)	
	11	_____ piles are used to resist large horizontal forces (anchor piles, batter piles)	
	12	_____ piles are not suitable for the region subjected to earthquakes. (Sand pile, timber pile)	
	13	General shear failure occurs in _____ (stiff clay, Soft clay)	
	14	According to Terzaghi's bearing Capacity theory, the base of the footing is assumed to be _____ (rough, smooth)	
Q.2	**(a)**	Write the purpose of foundation.	**03**
	(b)	Enlist methods of sub-soil exploration & explain any one method in detail.	**04**
	(c)	Discuss various types of soil samplers with neat sketch.	**07**
		OR	
	(c)	Explain penetration tests and their outcomes	**07**

Q.3	**(a)**	Calculate using Skemption's equation, the ultimate bearing capacity of a square footing on the surface of standard having unconfined compressive strength of 60 kN/m^2	**03**
	(b)	Give the comparison between disturbed and un disturbed samples.	**04**
	(c)	Discuss various types of shallow foundation with neat figures.	**07**
		OR	
Q.3	**(a)**	Calculate the ultimate point resistance of a pile, if the pile is embedded in a deep clay stratum. Take cohesion C=3.0 t/m^2.	**03**
	(b)	Define: (1) Gross bearing capacity, (2) Ultimate bearing capacity (3) Safe bearing capacity, (4) Allowable bearing capacity.	**04**
	(c)	Writs of short note on: (a) Raft foundation (b) Grillage foundation.	**07**
Q.4	**(a)**	What is group efficiency of piles? Enlist various methods for determining group efficiency of plies.	**03**
	(b)	Explain Prandtal & Rankine's theories for the determination of bearing capacity. Also state their limitations.	**04**
	(c)	Explain plate load test & its significance.	**07**
		OR	
Q.4	**(a)**	Enlist various factors affecting bearing capacity.	**03**
	(b)	Calculate the minimum depth a foundation required to transmit a load of 50kN/m^2 in a cohesion less soil having γ = 17 kN/m^2 and ϕ =20^o. Also calculate the bearing capacity if the depth adopted is 1.5m using Rankine's formula.	**04**
	(c)	Explain the pile load test to determine the ultimate load carrying capacity of pile.	**07**
Q.5	**(a)**	Enlist various pile driving hammers & explain any one in detail.	**03**
	(b)	What is 'active zone' in black cotton soil? State properties of black cotton soil.	**04**
	(c)	Discuss stability criteria of cantilever retaining wall.	**07**
		OR	
Q.5	**(a)**	Determine the efficiency of group of nine piles (3x3) by Field's rule.	**03**
	(b)	Discuss drainage of back fill in retaining walls.	**04**
	(c)	Classify geotextile materials. What are the basic functions performed by geotextiles?	**07**

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