Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME - SEMESTER– I (New course)• REMEDIAL EXAMINATION – SUMMER 2015

Subject Code: 2712009 **Date:15/05/2015**

Subject Name: Advanced Foundation Engineering

Time: 10:30 am to 1:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Draw neat and clean figures with pencil only.**

Q.1	**(a)**	Explain the effect of contact pressure and rigidity of raft in the analysis of raft foundation.	**07**
	(b)	Elaborate the Meyerhofôs bearing capacity theory and state how it differs from Hansonôs bearing capacity equation.	**07**
Q.2	**(a)**	A rectangular footing 2.2 m x 3.5 m rests on a c-ű soil with its base at 1.2 m below ground surface. Calculate the safe bearing capacity using a factor of safety of 2.50 against shear failure. The soil has following parameters. C = 6 kN/m^2, ű = 30^0, ɔ = 17.5 kN/m^3, N_c = 35.49, N_q = 23.18, $N_ɔ$ = 30.22. Use IS method.	**07**
	(b)	Explain the circumstances where the Raft foundations are used? Draw typical sketch of raft foundation.	**07**
		OR	
	(b)	Explain differential settlement. What are the causes of differential settlement?	**07**
Q.3	**(a)**	Explain the soil design steps for combined footing? Elaborate the factors affecting it.	**07**
	(b)	Explain the Liquefaction. What are the factors affecting it? Elaborate its mitigation steps.	**07**
		OR	
Q.3	**(a)**	Explain the concept of CNS layer in detail.	**07**
	(b)	What do you understand by soil-structure interaction? Elaborate it.	**07**
Q.4	**(a)**	Describe Under-reamed pile foundation.	**07**
	(b)	A concrete pile, 35 cm dia. is driven in medium dense sand for a depth of 10 m. The soil properties are: ū = 32°, ɔ = ^{18} kN/m^3. Estimate the safe load with factor of safety 2.8.	**07**
		OR	
Q.4	**(a)**	A group of 12 piles with 4 piles in a row was driven into soft clay extending from ground level to a great depth. The diameter and length of piles were 35 cm and 12m respectively. The unconfined compressive strength of the clay is 65 kPa. If the piles were placed 100 cm center to center, compute the allowable load on the pile group on the basis of a shear failure criteria for a factor of safety = 2.8.	**07**
	(b)	Explain floating raft foundation.	**07**
Q.5	**(a)**	Explain the steps of stability analysis for the well foundation.	**07**
	(b)	Explain p-y curves and its utility.	**07**
		OR	

Q.5	**(a)**	A machine having a total weight of 25000 kN has an unbalance such that it is subjected to a force of amplitude 5500 kN at a frequency of 650 rpm. Determine the spring constant for the supporting springs if the maximum force transmitted into the foundation due to the unbalance is to be 550 kN. Assume that the damping can be neglected	**07**
	(b)	List methods of analysis of block foundation and Explain any one in detail.	**07**

****