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

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –II Examination Dec. - 2011

Subject code: 1722005 **Date: 14/12/2011**

Subject Name: Advanced Foundation Engineering

Time: 02.30 pm – 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.**

Q.1 **(a)** State and explain Terzaghi's bearing capacity theory and state how it differs from Hanson's bearing capacity equation. **07**

(b) A foundation 1.5 m x 1 m is located at a depth of 1 m in clay. A soft clay layer is located at a depth of 1m measured from the bottom of the foundation Given: For top clay layer. Undrained shear strength = 120kN/m^2, γ =16.8 kN/m^3. For bottom clay layer Undrained shear strength = 48kN/m^2, γ = 16.2 kN/m^3. Determine the gross allowable load for the foundation with a factor of safety 4. **07**

Q.2 **(a)** Define "Foundation Modulus". How is it obtained? **07**

(b) Derive general solution for beams on elastic foundation and discuss its practical application. **07**

OR

(b) A concrete pile, 30 cm dia. is driven in medium dense sand for a depth of 8 m. The soil properties are: $\Phi = 35°$, $\gamma = 20$ kN/m^3. Estimate the safe load with factor of safety 3.0. **07**

Q.3 **(a)** What is bore log? Show a typical bore log and explain its utility. **04**

(b) Following is the cyclic pile load test data performed on 16 m long pile with dia. 400 mm driven in a deposit of sand. Compute allowable load on pile as per I.S. code of practice. **07**

Load (kN)	100	200	300	400	500	600	700	800	850
Total Settlement (mm)	0.4	1.2	2.4	3.25	5.6	8.25	11.25	17.0	27.25
Net Settlement (mm)	0.15	0.65	1.5	2.55	3.9	5.9	8.0	11.75	21.5

(c) Give factors affecting bearing capacity of soil in detail. **03**

OR

Q.3 **(a)** Explain p-y curves and its utility. **07**

(b) A single under reamed pile is to be installed in hard clay. Undrained strength obtained from a series of vane test at different depths have shown a liner relationship, cu = 50+8D in kN/m^2, where D is the depth in meters. The diameters of the pile shaft and the bulb are respectively 1 and 3 m. The center of the under-ream is located at 16m from the ground surface. Determine the allowable load on **07**

the pile to ensure an overall factor of safety of 2.0 Neglect resistance offered by a shaft beneath the bulb.

Q.4	**(a)**	Briefly describe design of RE wall.	**07**
	(b)	A machine having a total weight of 20000 kN has an unbalance such that it is subjected to a force of amplitude 5000 kN at a frequency of 600 rpm. What should be the spring constant for the supporting springs if the maximum force transmitted into the foundation due to the unbalance is to be 500 kN? Assume that the damping can be neglected.	**07**

OR

Q.4	**(a)**	List methods of analysis of block foundation and give any one in detail.	**07**
	(b)	Give the methods to determine dynamic soil parameters in field. Explain any one in detail.	**07**
Q.5	**(a)**	Draw neat sketch showing forces acting on well foundation and discuss criteria for determining grip length of well foundation.	**07**
	(b)	Write interpretations and limitations of SPT.	**07**

OR

Q.5	**(a)**	Discuss the methods to reduce settlement in building.	**07**
	(b)	Explain with the help of neat diagram, various applications of soil reinforcement.	**07**

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