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

GUJARAT TECHNOLOGICAL UNIVERSITY

ME Semester –II Examination Dec. - 2011

Subject code: 1721503 **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.**
4. **Use of I.S. 6403 is permitted.**

Q.1 **(a)** Discuss the effect of contact pressure and rigidity of raft in the analysis of raft foundation. **07**

(b) A square footing of size 4 x 4 m is founded at a depth of 2 m below the ground surface and in loose to medium dense sand. The corrected standard penetration test value N=11. Compute the net safe bearing pressure for a settlement of 40 mm by the use of modified equation of (a) Teng (b) Meyerhof. **07**

Q.2 **(a)** Critically compare Terzaghi's bearing capacity theory with Meyerhof's bearing capacity theory. **07**

(b) A 12m x 8m raft is founded at a depth of 4 m. in cohesive soil having unit cohesion of 100 kN / m^2. Determine the net ultimate bearing capacity of soil using (i) Terzaghi's equation, (ii) Meyerhof's equation, (iii) skempton's equation. **07**

OR

(b) Briefly describe effect of inclination and eccentricity of load on footing. **07**

Q.3 **(a)** Describe Under-reamed pile foundation. **07**

(b) A 40 KN Vertical compressor foundation system is operated at 40 HZ. Foundation soil having Cu = 4.0 x 10^4 kN /m^3.The weight of foundation and weight of soil participating in vibration is 16 KN and 20 kN respectively. The base area of foundation is 6 m^2. Take damping factor = 0.1. Determine the natural frequency and magnification factor. **07**

OR

Q.3 **(a)** Define : Amplitude , Free Vibration , Resonance , Forced vibration , Damping , Degree of freedom **07**

(b) A footing of 2m x 3m in size acted upon by a load inclined at 15°with the vertical and at an eccentricity of 0.3m from the centre along both axes. If the footing is placed at 2.0 m depth in c- ø soil having Γ_b = 17 kN / m^2, Γ_{sat} = 19 kN/m^2, c = 10 kN / m^2 and ø =32°. What load this footing can carry with factor of safety 2.5.If water table rises to 1.0 m from G.L., what reduction on capacity will occur ? **07**

For ø =32°, Nc =35.0, Nq = 21.7, N_Γ =20.6

N'c =21.4, N'q =10.0, N'_Γ =6.5

Q.4 **(a)** Explain with the help of neat diagram, various applications of soil reinforcements. **07**

	(b)	An RCC pile of length 14.5 m and diameter 0.94 m was constructed in a deep layer of stiff clay. The bottom of the pile was belled to a diameter of 1.86m. The average undrained shear strength, Cu along the shaft was 128 kN / m^2, and that at the base was 150 kN / m^2 .With factor of safety Fs =1.5 friction load and Fs = 3 for the tip load, determine the safe working load. Assume coefficient of adhesion $\alpha = 0.45$.	**07**

OR

Q.4	**(a)**	Explain p-y curves for the solution of laterally loaded piles**.**	**07**
Q.4	**(b)**	A group of nine friction piles arranged in a square pattern is to be proportioned in a deposit of medium stiff clay. Assuming the size of piles is 30 x 30 cm and 10 m long. Find the optimum spacing for piles. Assume $\alpha = 0.8$ and Cu = 50 kN / m^2	**07**
Q.5	**(a)**	Explain Negative skin friction on single pile and on group of piles.	**07**
	(b)	Explain with neat sketch any two functions of geotextiles.	**07**

OR

Q.5	**(a)**	Explain design criteria for satisfactory action of a machine foundation,	**07**
	(b)	Discuss the criteria for determining grip length of a well foundation.	**07**

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