Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013

Subject code: 1721503 **Date: 03-06-2013**

Subject Name: Advanced Foundation Engineering

Time: 10.30 am – 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.**

Q.1	**(a)**	What are the typical characteristics of GSF and LSF?	**07**
	(b)	A rectangular footing 1.8 m x 3.0 m rests on a c-ű soil with its base at 1.5 m below ground surface. Calculate the safe bearing capacity using a factor of safety of 3 against shear failure. Use IS method. The soil has following parameters. C = 8 kN/m^2, ű = 32^0, ɔ = 18.0 kN/m^3, Nc = 35.49, Nq = 23.18, Nɔ = 30.22.	**07**
Q.2	**(a)**	Under what conditions Raft foundations are used? Draw typical sketch of raft foundation.	**07**
	(b)	Explain differential settlement. What are the causes of differential settlement?	**07**
		OR	
	(b)	What are the different methods to design Raft foundation? Explain any one in detail.	**07**
Q.3	**(a)**	Draw neat sketch of well foundation and explain grip length for wells.	**07**
	(b)	Explain different method to rectify the tilting of well with sketches.	**07**
		OR	
Q.3	**(a)**	Elaborate the use of finite element method for the analysis of raft foundation.	**07**
	(b)	How subgrade modulus is determined in field? Give its limiting values for different types of soils.	**07**
Q.4	**(a)**	Define: Anvil, Tup, Foundation block, Protective cushion layer, Foundation support.	**07**
	(b)	What are the advantages and applications of reinforced earth structures?	**07**
		OR	
Q.4	**(a)**	Describe function and properties of geotextile with sketches.	**07**
	(b)	Describe design criteria to design of foundation for reciprocating type machine.	**07**
Q.5	**(a)**	Prepare short note on pile driving technique.	**07**
	(b)	Design a friction pile group to carry a total load of 3000 kN for uniform clay to a depth of 19 m underlain by rock. Average unconfined compressive strength of the clay is 70kN/m^2. A factor of safety 3 is required against shear failure.	**07**
		OR	
Q.5	**(a)**	What is vibro-pile? Describe different stages in forming a vibro-expanded pile step by step.	**07**
	(b)	A reinforced concrete pile is driven into the ground by a drop hammer weighing 42 kN. Determine the ultimate bearing capacity and the allowable load for the pile. The remaining data as under: (1) Weight of pile = 32 kN, (2) Effective fall of hammer = 0.8 m, (3) Average set per blow = 1.4 cm, (4) Total temporary elastic compression = 1.8 cm, (5) Coefficient of restitution = 0.25, (6) Factor of safety = 2.	**07**