

GUJARAT TECHNOLOGICAL UNIVERSITY
ME - SEMESTER- I • EXAMINATION – WINTER 2014

Subject Code: 2712009**Date: 12/01/ 2015****Subject Name: Advanced Foundation Engineering****Time: 02:30 p.m. to 05:00 p.m.****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) Explain the different types of bearing capacity failure with their typical characteristics and sketches. **07**
- (b) Explain the mitigation methods for liquefaction. **07**
- Q.2** (a) Explain in short soil-structure interaction. **07**
- (b) Explain the stability analysis for well foundation. **07**
- OR**
- (b) What do you understand by waffle slab? Explain its importance and use. **07**
- Q.3** (a) Explain the steps of soil design of combined footing. **07**
- (b) A group of twelve piles with four piles in a row was driven into clay extending from ground level to a great depth. The unconfined compressive strength of the clay is 90 kN/mm^2 . 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 = 2.7. Assume the diameter and lengths of piles were 30 cm and 10 m respectively. **07**
- OR**
- Q.3** (a) A group of twelve friction piles arranged in a square pattern is to be proportioned in a deposit of medium stiff clay. Assuming the size of piles is 35 cm x 35 cm and 12 m long. Find the optimum spacing for piles. Assume $\phi = 0.82$ and $C_u = 45 \text{ kN / m}^2$. **07**
- (b) Explain under reamed pile foundation. **07**
- Q.4** (a) Explain SPT test with its advantages and disadvantages. Also states its use. **07**
- (b) Give the methods to determine dynamic soil parameters in field. Explain any one in detail. **07**
- OR**
- Q.4** (a) Explain the concept of CNS layer. **07**
- (b) A machine having a total weight of 25000 kN has an unbalance such that it is subjected to a force of amplitude 6000 kN at a frequency of 750 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 600 kN? The damping can be neglected. **07**
- Q.5** (a) Explain Negative skin friction on single pile and on group of piles. **07**
- (b) Elaborate the design steps of block foundation. **07**
- OR**
- Q.5** (a) Explain design criteria of a machine foundation. **07**
- (b) Define foundation modulus. Explain how it is obtained. **07**