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M.Tech.(Geo Technical Engineering) (2013 Batch) M.Tech.(Soil Mechanics & foundation engineering)(2013 & Onwards)

(Sem.-2)

## ADVANCE FOUNDATION ENGINEERING

## Subject Code : CESE-2

## Paper ID : [E1003]

Time: 3 Hrs.

Max. Marks: 100

## **INSTRUCTIONS TO CANDIDATES :**

- 1. Attempt any FIVE questions out of EIGHT question.
- 2. Each question carries TWENTY marks.
- Estimate the size of square footing of a column carrying a load of 1500 kN in a sand deposit with average N value of 15. Assume an allowable settlement of 25 mm depth of foundation 2m. Water level is also at foundation level and unit weight of soil is 18kN/m<sup>3</sup>. (20)
- 2. Apply Boussinesq's equation to derive an expression for the stress at any depth below the centre of a circular area carrying a uniformly distributed load. (20)
- 3. a) How can you decide whether a clay deposit at a site is normally consolidated or over consolidated? (10)
  - b) Describe timber piles with the common defects of timber piles and the method of splicing. (10)
- 4. A 12m long and 300mm diameter precast concrete pile is driven into a clay where the unconfined compressive strength is 70 kPa and the unit weight is 19kN/m<sup>3</sup>. Estimate its load carrying capacity .What fraction of the load is being carried by shaft? (20)
- 5. a) What are the common types of machine foundation? Draw schematic diagrams of each of them.
  - b) Briefly discuss the general requirements of machine foundations. (10)
- 6. Explain Elastic soil spring method of vibration analysis of foundation (Barkans method). (20)
- 7. Draw the section of a well foundation and mention the components of a well foundation. What is the criteria for selecting the depth of a well? (20)
- 8. It is required to install a sheet pile for retaining a cohesive deposit upto 5.2m above the dredge level. The water table is located at 1.6m below GL. The properties of the soils are given below :

Soil above DL: 
$$\gamma = 16.8 \text{ kN/m}^3$$
,  $\gamma_{\text{sat}} = 19.3 \text{ kN/m}^3$ ,  $q_u = 40 \text{kPa}$ 

Soil below :  $\gamma_{sat} = 20.2 \text{ kN/m}^3$ ,  $q_u = 75 \text{kPa}$ 

Find the minimum depth of embedment of the sheet pile that can be barely maintain its stability. (20)

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