



(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 100651**

Roll No.

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**B. Tech.**

(SEM. VI) THEORY EXAMINATION, 2014-15  
**ADVANCED FOUNDATION DESIGN**

Time : 2 Hours]

[Total Marks : 50

Answer **all** the questions :

1 Attempt any **two** parts of the following : **6×2=12**

- (a) Show the expression for the Westergaards solution for the vertical stress due to (i) point load, (ii) line load of finite length (iii) due to rectangular loaded area (iv) circular loaded area.
- (b) Write the assumptions for the Boussinesqs method for determination of the stress increment due to an external load. Show all the expressions for the normal and tangential stresses with neat sketch. For a rectangular distributed load of  $200\text{kN/m}^2$ . show the distribution of vertical stress intensity on a horizontal plane at a depth of 3m below the base of footing by 2:1 dispersion method.

- (c) A long flexible strip footing of 2.5 m width having a smooth base is subjected to uniformly distributed load of 80kN/m run. Determine the vertical stress intensity at a depth of 2m below a line parallel to the centre line of footing at a distance of 3m from it.

2 Attempt any **two** parts of the following : **6×2=12**

- (a) Show and explain terzaghis bearing capacity failure in soil with the help of their neat sketches. How will you modify the bearing capacity equations for the different cases of water table location ? Give  $\phi$  values for different types of failures.
- (b) Give all the steps to calculate the elastic settlement of sandy soil by using strain influence factor. Also show the variation of the strain influence factor with Z.
- (c) For  $L/B=5.0$ ; Explain all the steps, which will you follow for determining the settlement in the cohesion less soil by using the Schmertmann approach.

3 Attempt any **two** parts of the following : **6×2=12**

- (a) A group of 20 piles, each having a diameter of 600mm and 12 m long are arranged in 4 rows at a spacing 1.2 m centre to centre. The capacity of each pile is 380kN. Determine the group efficiency of pile.

100651]

2

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- (b) What do you mean by laterally loaded piles? Why batten piles are more effective than vertical piles in resisting the horizontal loads? Give all the basic steps to find the forces in pile by Culman's method.
- (c) What are the various laboratory methods used to determine the dynamic properties of soil? Explain them briefly. What is forced damping?

4 Attempts any **two** parts of the following :  $7 \times 2 = 14$

- (a) What are the various methods for analyzing the stability analysis of finite slopes? Write all the steps with their neat sketch; involve in the Bishop's simplified method of slices for analyzing the stability of slopes.
- (b) Discuss the various types of piles which are used in the construction work on the basis of their structural characteristics with their advantages and disadvantages.
- (c) Which type of pile foundation will you use for the expansive soil? Explain the particular types with a neat sketch. Also give the expression for finding the capacity of pile for single bulb under reamed piles.