

BACHELOR OF ENGINEERING (CIVIL ENGINEERING)
FOURTH YEAR SECOND SEMESTER EXAM - 2022

Design of Foundation

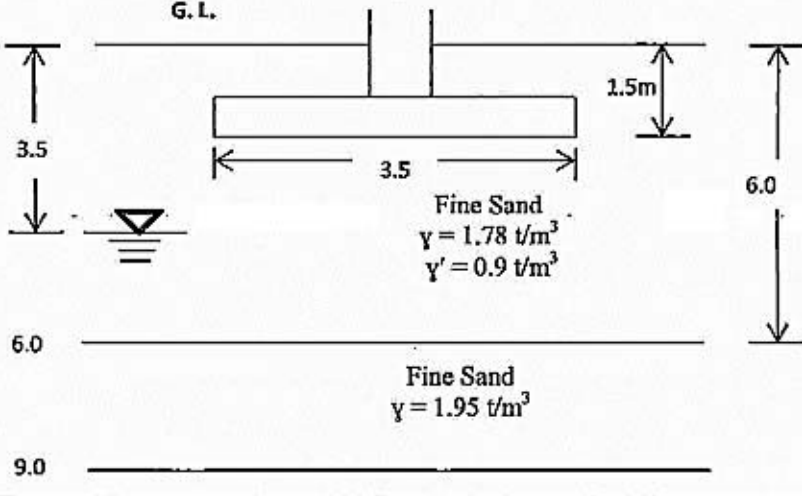
PART-I

[Answer All the Questions]

[Use code: IS: 6403, IS: 2131 & IS: 8009]

Total = 100

This Part = 60

1.(a)	Write a short note on 'Location and Depth Criteria' in design of shallow foundation.	[8+6]
(b)	Discuss in brief about the 'interference effect' in shallow foundation design.	
2. (a)	<p>Column carrying a superimposed load of 1350 kN is to be founded in sand as shown in the Figure below. Calculate the settlement of the foundation (3.5m x 3.5m) using the following method:</p> <p>(a) Elastic method (b) SPT method (c) Buisman method</p> 	[16+10]
(b)	<p>Determine the net allowable bearing capacity of the footing depicted above using IS code recommendations.</p> <p>[Correct the 'N' value as per IS recommendations; To calculate Φ of the sand, use corrected avg. N value up to B depth and use Fig. 1 of IS: 6403]</p>	

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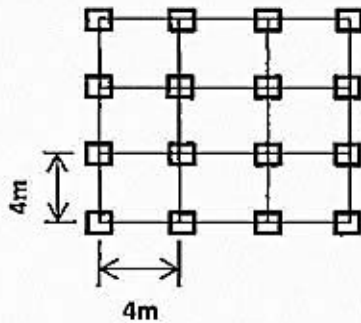
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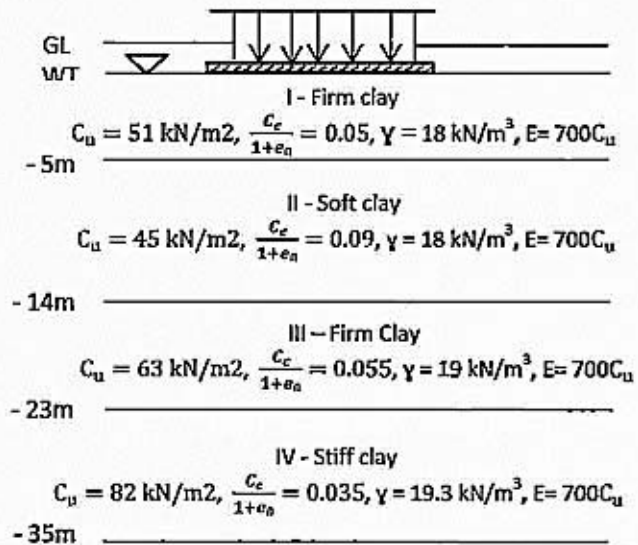
Total = 100

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3. Design a raft foundation for the building shown in Figure below:



[Inner Columns = 700 kN each]
 [Outer Columns = 600 kN each]



[20]

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Subject : DESIGN OF FOUNDATION (PART II)

TIME 3 HOURS FULL MARKS 40

USE SEPARATE ANSWERS SCRIPTS FOR EACH PART (USE IS:2911 CODE)

1. Design a pile group proposed to be constructed to carry 600-ton column load at a site with subsoil stratification as given below: [15]

0-4m Brownish grey silty clay/clayey silt; Bulk density 1.85 t/m^3 ; Cohesion 3.5 t/m^2 ; $mv=0.004\text{m}^2/\text{ton}$

4-14m Dark grey / grey silty clay/clayey silt with decomposed wood; Bulk density 1.70 t/m^3 ; Cohesion 2.5 t/m^2 ; $mv=0.006\text{m}^2/\text{ton}$

14-18m Bluish grey silty clay/clayey silt with kankars; Bulk density 1.90 t/m^3 ; Cohesion 6.5t/m^2 ; $mv=0.003\text{m}^2/\text{ton}$

18-40m Brownish grey / mottled brown silty clay/clayey silt with traces of fine sand; Bulk density 2.00 t/m^3 ; Cohesion 6.5 t/m^2 ; $mv=0.003\text{m}^2/\text{ton}$

Take a suitable diameter and length of the pile.

2. For the pile group as designed in Q1 and soil stratification given in Q1 determine the settlement of the pile group for the given load. [10]

3(a) Discuss the criteria for determination of horizontal capacity of a bored cast-in-situ vertical pile.

(b) Determine the lateral / horizontal capacity of a single pile of diameter 600mm and length 20m constructed in a sand deposit with properties given below:

0-10m Loose brownish grey silty sand $N=10$ blows/30cm, Bulk density 1.82 t/m^3 , $\phi = 30^\circ$

10-20 m Medium grey silty sand $N=26$ blows/30cm, Bulk density 1.90 t/m^3 , $\phi = 33^\circ$

20-30m Dense brownish grey silty sand $N=45$ blows/30cm, Bulk density 1.95 t/m^3 , $\phi = 35^\circ$

You may use relevant IS code.

[5+10=15]