

Code No: I8705/R16

M. Tech. I Semester Regular/Supple Examinations, Jan/Feb-2018

SUB-STRUCTURE DESIGN

Common to Structural Engineering (87) and Structural Design (85)

Time: 3 Hours

Max. Marks: 60

*Answer any FIVE Questions
All Questions Carry Equal Marks*

1. a What is soil exploration and what is the need for carrying it? What might happen if soil exploration is not carried out/ carried out half-heartedly? 8M
- b What is a borelog report? 4M
2. a Discuss the type of samples? 6M
- b What kind of care is to be exercised for preservation, labeling and shipment of soil samples? 6M
3. a Explain the procedure to determine the bearing capacity of stratified soils? 6M
- b A 1.8m square column is founded at a depth of 1.8m in sand, for which the corrected N-value is 24. The water table is at a depth of 2.7m. Determine the net allowable bearing pressure for a permissible settlement of 40mm and a factor of safety of 3 against shear failure. 6M
4. a Discuss the types of shallow foundations and the criteria to choose any one of these? 6M
- b Explain the IS procedure to design raft foundations? 6M
5. Explain the cyclic pile load test? 12M
6. Proportion a strap footing for the following data: 12M
 Allowable pressures:
 (i) 150 kPa for (DL + reduced LL)
 (ii) 225 kPa for (DL + LL)

	Column loads	
	Column A	Column B
DL	540kN	690kN
LL	400kN	810kN

Proportion the footing for uniform pressure under (DL + reduced LL). Distance c/c of columns = 5.4 m

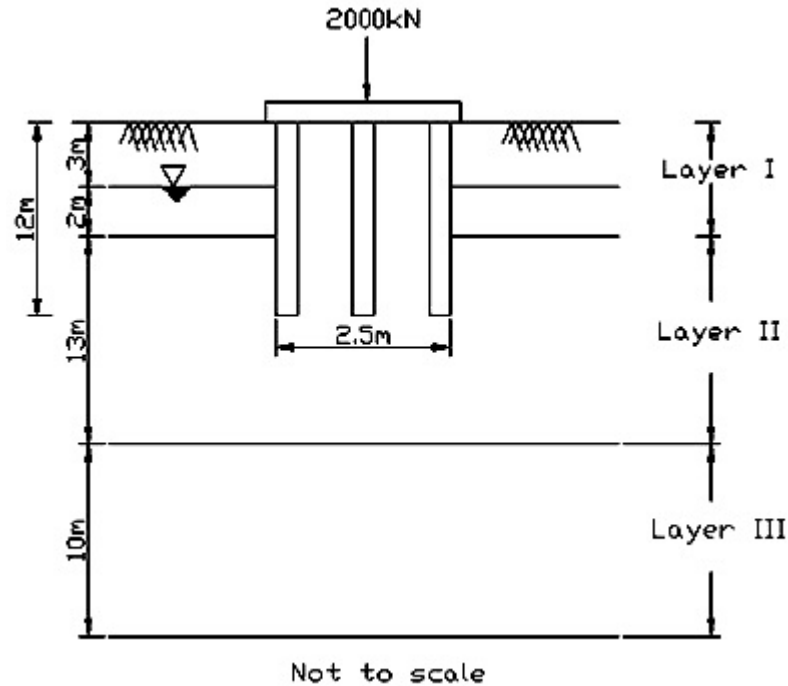
Projection beyond column A not to exceed 0.5m.

DL + reduced LL for column A = 740kN

DL + reduced LL for column B = 1095kN

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7. Write a note on the two popular geophysical methods? 12M
8. A group of piles with pile diameter 30cm is subjected to a load of 2500kN as shown in the figure below. Estimate the consolidation settlement. 12M



For Layer I : above WT, $\gamma = 16\text{kN/m}^3$
below WT, $\gamma = 20\text{kN/m}^3$
For Layer II : $\gamma_{\text{sat}} = 21\text{kN/m}^3$, $C_c = 0.26$, $e_0 = 0.75$
For Layer III : $\gamma_{\text{sat}} = 23\text{kN/m}^3$, $C_c = 0.22$, $e_0 = 0.60$
Use a load dispersion of 1 horizontal : 2 vertical
