Code No: G8705/R13

M. Tech. I Semester Supplementary 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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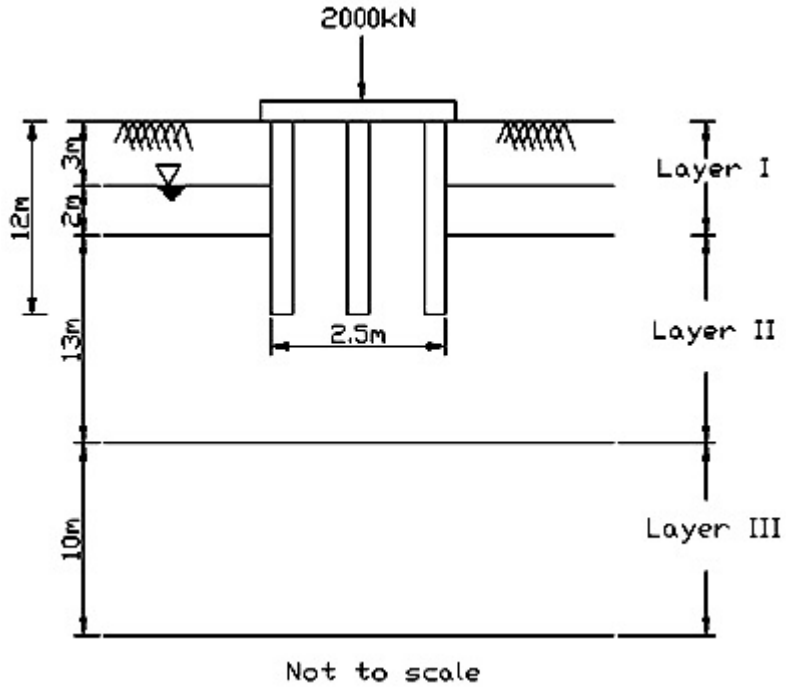
7. Write a note on the two popular geophysical methods? 12M

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

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