Ref. No.: Ex/CON/T/414/2018 (S)(Old)

B. Constn. Engg. 4th Year 1st Sem. Supple. Exam. 2018 (Old)

Foundation System

Time : Three hours | Full Marks : 100

Part - I

Answer any two questions.

Q.1.(a) State and explain the formula as given in IS codes with regard to the determination of static load carrying capacity of driven piles in clayey soil. 5

Q.1.(b) Given below is the details of sub-soil profile of a site.

Strata No.	Soil stratification	Type of Soil	Thickness (m)	Design Parameter		Bulk Density, T/m^3
				c_u T/m^2	ϕ_u	
I	Soft brownish grey silty clay	c	2.1	2.8	0.0	1.82
II	Medium stiff grey/dark grey Silty Clay	c	6.7	5.5	0.0	1.86
III	Medium dense /dense brownish grey silty sand	phi	5.3	0.0	30	1.89
IV	Very dense yellowish brown silty sand	phi	4.9	0.0	32	1.90

The water table may be assumed to be located at the ground surface. Determine the safe vertical load carrying capacity of a 500mm diameter bored cast-in-situ pile having cut-off level at a depth of 1.5m below ground level.

Assume length of pile as 17.5m.

Use of relevant IS code is allowed. 12

Q.1(c) Calculate the safe pile capacity in uplift for the above pile. 8

Q.2(a) Briefly explain some of the well-known pile driving formulae explaining the meanings of the various terms. 5

Q.2(b) Calculate the lateral capacity of the vertical pile as given in the problem of Q.1(b) by IS method for fixed head condition. Assume M25 grade of concrete. 20

Q.3(a) What are the criteria for ascertaining safe lateral load on single pile from routine load test as per IS code? 5

Q.3(b) Write short notes on : 5

i) Initial test

ii) Routine test

Q.3(c) Determine the silt factor of soil collected from a river bed with the following gradations. 10

Sieve Size (mm)	Weight of soil retained(gm)
4.00	0
2.00	17.2
1.18	76.5
0.425	79.2
0.150	151.4
0.075	43.0
Pan	55.4

Q.3(d) Enumerate the principal features of sinking of wells. 5.

FOUNDATION SYSTEM (Full marks -50) Part-II Ex/CON/T/414/2018(S)

Assume relevant data if required.

Answer any two questions.

1. Determine the (a) ultimate bearing capacity (b) net ultimate bearing capacity (c) net ultimate safe bearing capacity and (d) allowable bearing capacity of a soil with 2m x 3m rectangular footing resting at a depth of 1.0 m on clayey silt having C= 2.5 t/m^2 , $m_v = 0.0032\ m^2/t$, E= 1000 t/m^2 . (25)

2. Write notes on the following.

(a) Local shear failure.

(b) Skempton's theory

(c) Mayerhoff theory

(d) Ground water table correction

(e) Immediate settlement. (5 X 5 = 25)

3.(a) Describe the method for obtaining settlement below foundation using plate load test. (10)

(b) Explain the significance of differential settlement and angular distortion in respect to stability of shallow foundation (10)

© Explain raft foundation. (5)