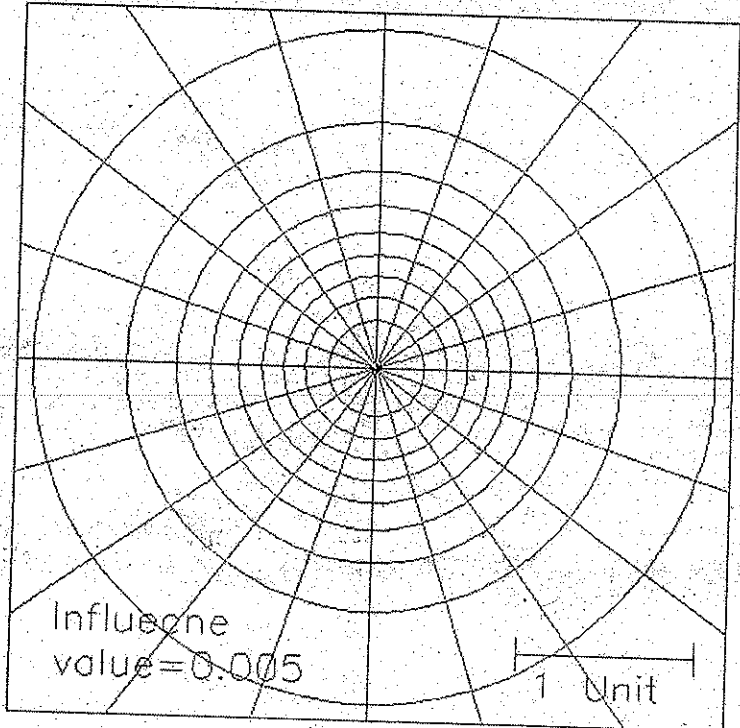


Ref No. - Ex/CE/T/414/2018(S)

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING EXAMINATION, 2018
(4TH YEAR 1ST SEMESTER SUPPLEMENTARY)
 (1st / 2nd Semester / Repeat / Supplementary / Spl. Supplementary / Old / Annual / Biannual)
SUBJECT: DESIGN OF FOUNDATION
 (Name in full)

Time: Two hours / Three hours / Four hours / Six hours

Full Marks 30/100

No. of Questions	PART I (60 marks)	Marks
	<i>Answer all questions</i>	
Q1 a)	What are different types of foundations adopted to transfer superstructure loads to the subsoil in practice? Discuss with neat sketches.	10
b)	Why factor of safety is applied on ultimate bearing capacity of soil? Give typical values of factor of safety adopted for different types of foundations provided for buildings, oil storage tank and embankment.	10
c)	Design a shallow foundation for a column load of 500 kN for the subsoil data given below: Stratum I : Depth 0 – 3.0m : Brownish grey silty clay / clayey silt $\gamma = 18.5 \text{ kN/m}^3$, $C_u = 35 \text{ kN/m}^2$, $C_c/1+e_0 = 0.12$, $p_c = 75 \text{ kN/m}^2$, $C_c/1+e_0 = 0.05$ Stratum II : Depth 3.0 – 15.0m : Dark grey silty clay / clayey silt with decomposed wood $\gamma = 16.5 \text{ kN/m}^3$, $C_u = 15 \text{ kN/m}^2$, $C_c/1+e_0 = 0.15$ Stratum III : Depth 15.0 – 18.0m : Stiff / very stiff bluish / mottled brown silty clay / clayey silt with rusty spots $\gamma = 19.5 \text{ kN/m}^3$, $C_u = 75 \text{ kN/m}^2$, $C_c/1+e_0 = 0.09$ Stratum IV : Depth > 18.0m till 35.0m : Dense / very dense sand $\gamma = 20 \text{ kN/m}^3$, $\phi = 36^\circ$ Ground water table at a depth of 1.5m below G.L. Use Newmark's chart given below for determining vertical stresses below foundation. Assume reasonable values of data not given.	15
		

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SUBJECT: DESIGN OF FOUNDATION

(Name in full)

Full Marks 30/100

Time: Two hours/Three hours/Four hours/Six hours

No. of Questions	PART I (60 marks)	Marks
Q2	<p>A raft foundation is to be constructed for a multistoried building with total column load of 60000 kN. Size of the raft is 25m x 20m. Use soil data given in Q1(c).</p> <p>Design the raft foundation considering the following aspects:</p> <ol style="list-style-type: none"> Which type of raft foundation may be adopted for the proposed building and also specify the corresponding depth of the foundation. Further, check the stability of the foundation against its bearing capacity considering appropriate factor of safety. Calculate both immediate and consolidation settlement corrected applying suitable correction factors and check whether it is more or less than the permissible value. If the corrected settlement is more than permissible value, modify the design appropriately. 	5+5+15=25

B. CIVIL ENGG. 4th YEAR 1st SEMESTER SUPPLEMENTARY EXAMINATION 2018
(1st Semester)

DESIGN OF FOUNDATION

Time: Three Hours

Full Marks 100
(Part I: 60 Marks
Part II: 40 Marks)

Use a separate Answer-Script for each part

Question No.	Part II (40 Marks)					Marks
<p>Answer ANY TWO questions from this Part. IS 2911 PART I and II to be allowed. Assume reasonable values of data, if not supplied</p>						
Q.1	Subsoil profile and properties at a site are as follows:					
	Stratum	Description	Depth	Bulk Density (kN/m³)	Shear Parameters	
					C (kN/m²)	φ (degree)
	I	Filling	0m-2m	18	-	-
	II	Medium to stiff brownish grey silty clay	2m-10m	19	65.0	0
	III	Medium to dense silty fine sand	10m-30m	20	0	32
	Ground water table is near ground surface. Find allowable (a) Vertical (b) Uplift and (c) lateral load for 500 mm and 600 mm diameter R.C.C. bored piles using IS 2911-2010.					8+4+8 =20
Q.2	A group of four piles (2×2) was driven into soft clay. Diameter and shaft length of the pile were 500 mm and 13.5 m respectively with cut off depth of 2m below EGL. Water table is at ground surface. The group supports a footing of size 2.0 m×2.0 m. The load on the footing is 550 kN. Find the settlement of the pile group.					20
Q.3	a)	Explain the phenomenon of negative skin friction in piles when a recently placed sand fill is helping in consolidation of a soft clayey deposit underlying the fill.				10
	b)	Explain how pile load test is conducted in the field and also illustrate how allowable pile load is estimated with the help of IS 2911.				10