Ref. No. Ex//CE/T/413//2017(S)

B. CIVIL ENGG 4th YEAR 1st SEM. SUPPLEMENTARY EXAM 2017

DESIGN OF FOUNDATION

Time: Three Hours

Full Marks 100
(Part I: 50 Marks
Part II: 50 Marks)

Use a separate Answer-Script for each part

Question No.	Part I (50 Marks)	Marks
	*Answer **ANY TWO** questions from this Part.* *Assume reasonable values of data, if not supplied* *IS 2911-2010 Part 1 and 2&IS6403 are allowed*	
Q.1	a) Explain in which case pile foundation needs to be adopted. b) A reinforced concrete bored cast-in-situ pile of 500mm diameter and 20m length is to be constructed at a site. The subsoil profile consists of a clayey silt deposit with unit weight of 18.5 kN/m^3 and unconfined compressive strength of 1000 kN/m^2 existing down to a depth of 8m below GL. This is followed by coarse sand having unit weight of 19 kN/m^3 and angle of shearing resistance of 32 degrees. The water table is close to the ground surface. Find the allowable load that the pile would be able to carry under compression and uplift. Use the method recommended in IS 2911-2010	5+20=25
Q.2	a) Find out the lateral load carrying capacity of a 550mm diameter RCC bored Cast-in-situ pile which is 20m long and constructed through a sand deposit of average N value of 15. Use the method recommended in IS 2911-2010, if it is applicable. b) Explain how settlement of a single pile can be found out.	20+5=25
Q.3	a) Explain, with the help of a neat sketch, how a routine pile load test can be conducted at a site. Illustrate also the criteria of determination of safe load as per IS 2911 Part 4-2010 b) Explain the phenomenon of 'Negative Skin Friction' with the help of a neat sketch, illustrating its effect on estimation of pile capacity.	17+8=25

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BACHELOR OF ENGINEERING IN CIVIL ENGINEERING EXAMINATION, 2017
(4TH YEAR 1st SEMESTER)
(1st / ~~2nd~~ Semester/ ~~Repeat~~/ Supplementary/~~Spl. Supplementary/Old/ Annual/ Biannual~~)
SUBJECT: DESIGN OF FOUNDATION
(Name in full)

Full Marks ~~30~~/100

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

No. of Questions	PART II (50 MARKS)	Marks
	Answer all questions	
Q1 a)	Give the expression for vertical stress below a circular area placed over ground surface. Discuss how this is used to develop Newmark's chart.	7
b)	Why factor of safety is applied on ultimate bearing capacity of soil? Give typical values of factor of safety for flexible and rigid foundation.	5
c)	Design a shallow foundation for a column load of 450 kN for the subsoil data given below: Depth 0 – 3.0m : Brownish grey silty clay / clayey silt $\gamma = 18.6$ kN/m^3 , $C_u = 35$ kN/m^2, $m_v = 0.0004$ m^2/kN Depth 3.0 – 15.0m : Dark grey silty clay / clayey silt with decomposed wood $\gamma = 17.5$ kN/m^3 , $C_u = 15$ kN/m^2, $m_v = 0.0006$ m^2/kN Depth 15.0 – 18.0m : Stiff / very stiff bluish / mottled brown silty clay / clayey silt with rusty spots $\gamma = 19.5$ kN/m^3 , $C_u = 80$ kN/m^2, $m_v = 0.0003$ m^2/kN Depth > 18.0m till 35.0m : Dense / very dense sand $\gamma = 20$ kN/m^3, $\varphi = 36^0$ Ground water table at a depth of 1.0m below G.L. Use 2V:1H dispersion for determining vertical stresses below foundation.	13
Q2(a)	What is allowable settlement? Give typical values for allowable settlement for a raft foundation resting over clay deposit.	5+20 =25
(b)	A raft foundation is to be constructed for a multistoried building with a total column load of 50000 kN. Size of the raft is 25m x 20m. Use soil data given in Q1(c). Design a buoyancy raft foundation considering the following aspects: a. Depth of foundation b. Bearing capacity c. Allowable Settlement of 125mm	