Ref No.–Ex/ Ex/CE/T/326/2018

BACHELOR OF ENGINEERING IN CIVIL ENGINEERING EXAMINATION, 2018

(3RD YEAR 2ND SEMESTER)

(1st/ 2nd Semester/~~Repeat/ Supplementary/Spl. Supplementary/Old/ Annual/ Biannual~~)

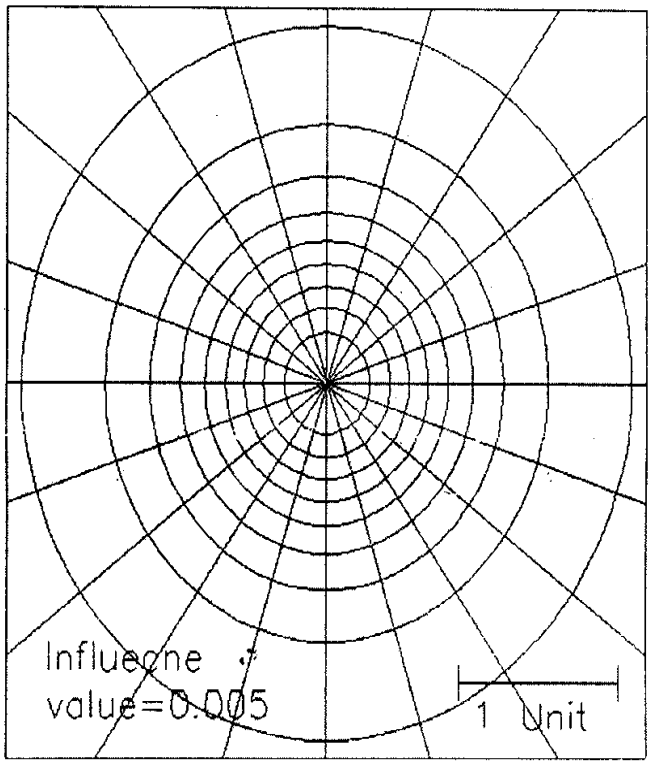
SUBJECT: SOIL MECHANICS II

(Name in full)

Full Marks ~~30~~/100

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

No. of Questions	Part I (60 MARKS)	Marks
	Answer all questions	
Q1	What are the assumptions of Boussinesq's theory of stress distribution ? Using the Newmark's chart given below determine the stresses at depth 5m, 10m and 15m below the centre and inner edge of an annular footing of outer diameter 10m and inner diameter 5m resting at a depth of 2m below G.L. Average pressure over the foundation is 80 kPa.	3+12=15
Q2	A 8m retaining wall, with a vertical back face and resting over hard soil, retains homogeneous compacted clay. Unit weight of the clay is 19.5 kN/m^3 and undrained shear strength parameters are c= 35 kPa and $\varphi = 15^0$. a. Draw the variation of Rankine's active pressure on the wall with depth. b. Determine the total active force per unit length of the wall. Also find the location of active force. c. What will be the increase or decrease in active force per unit length if the soil gets saturated due to rain and the corresponding shear strength parameters mobilized become c = 5kPa, $\varphi = 26^0$. Neglect increase in unit weight due to saturation.	5+7+8 =20



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(3RD YEAR 2ND SEMESTER)

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SUBJECT: SOIL MECHANICS II

(Name in full)

Full Marks ~~30~~/100

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

No. of Questions	Part I (60 MARKS)	
Q3	Derive the expression for Factor of safety of an Infinite slope. A 4m high embankment is to be constructed over a deep soft clay deposit. Properties of embankment and foundation soil are as follows: Embankment soil : c = 40kpa, $\varphi = 12^0$, $\gamma = 20kN/m^3$ Foundation soil : c = 25kpa, $\varphi = 0^0$, $\gamma = 17kN/m^3$ Inclination of the slope : 1.5H:1V. Surcharge over the embankment is 40kPa. Ground water table is at the ground level. Determine the factor of safety of the slope for a typical slip circle passing through the toe of the embankment using method of slices. Give detail calculation.	8+

Form A: Paper-setting Blank

Ref No. Ex/CE/T/326/2018

B.E. CIVIL ENGINEERING THIRD YEAR
SECOND SEMESTER EXAM 2018

(~~1st~~/2nd Semester/~~Repeat/Supplementary/Spl. Supplementary/Old/Annual/Bi Annual~~)

SUBJECT: **SOIL MECHANICS - II**

(Name in full)

PAPER ××××

Time: ~~Two hours~~/ Three hours/~~Four hours/Six hours~~ Full Marks ~~30~~/100

(~~15~~/40 marks for this part)

Use a separate Answer-Script for each part

Page : 1 of 2

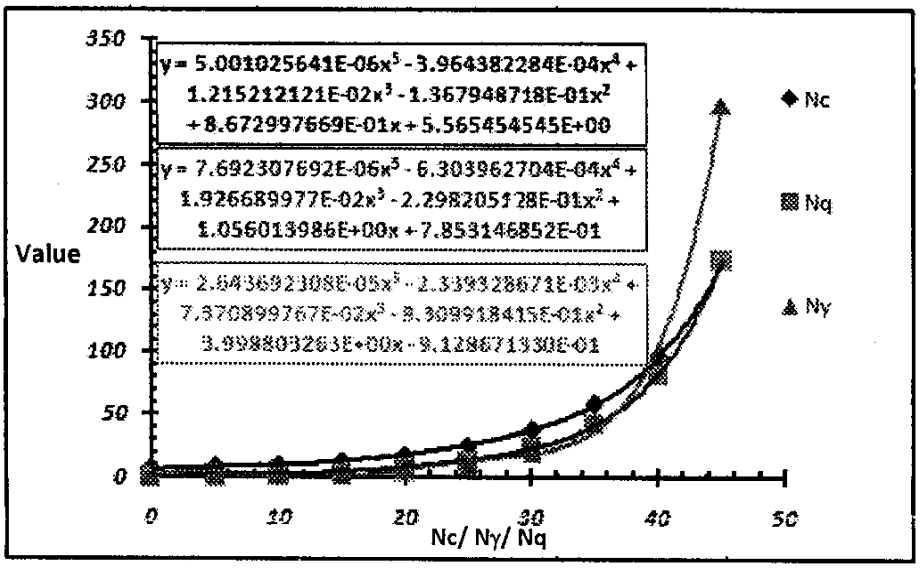
1. *Answer all questions.*
2. *Maintain neatness. Assume reasonable value of data if it is not supplied. Use supporting figures given as and when required.*
3. All drawings-must be drawn by pencil. Do not retain mobile phone during examination.
4. No code etc. will be needed to answer the questions of this part

No. of Question	Part - II	Marks
	Answer any one between (1)(A) and (1)(B):	
(1)(A)	Define (any three) a) Net loading intensity, b) Ultimate bearing capacity, c) Net safe bearing capacity, d) Allowable bearing capacity.	3×2 =6
	OR	
(1)(B)	Show the expected trend of load versas settlement relationship of the footing for (any two): a) General Shear Failure, b) Local Shear Failure, c) Punching Shear Failure.	2×3 =6
(1)(C)	An R.C.C. column footing of 6 m × 6 m size is founded at 1.5 m below G. L. The subsoil consists of a loose deposit of silty sand having the following properties: γ = 1.8 t/ m^3, ϕ= 20^0 and c = 1.15 t/ m^2 Determine the ultimate bearing capacity of the footing when the ground water table is located at: a) ground level, b) 0.6 m below ground level, c) 2.0 m below the base of the footing, d) 4.0 m below the base of the footing. Given, for ϕ= 20^0, N_c'= 11.8, N_q'= 3.8, N_γ'= 1.3.	7
(1)(D)	What is the effect of water table on bearing capacity? Clarify with sketch.	5
	Or	Or
	Write down the bearing capacity equation used as per i) IS code clarifying the meaning of the notations used in the equation, ii) Brinch Hansen clarifying the meaning of the notations used in the equation.	(3+2) =5
(1)(E)	Is there any relation between the effective stress and bearing capacity? What is your opinion in this regard and why?	2
(2)(a)	(a) What is meant by 'soil exploration'? (b) What are the objectives of sub-soil exploration?	3+3 = 6
(2)(b)	Discuss in general manner about the four phased sequence of execution of a sub soil exploration program.	14

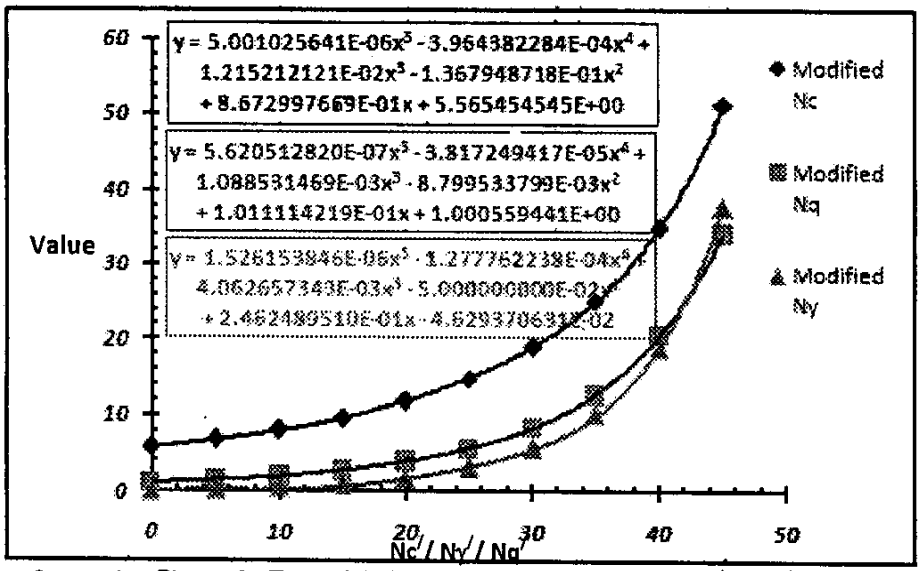
B.E. CIVIL ENGINEERING THIRD YEAR
SECOND SEMESTER EXAM 2018
(~~1st~~/2nd Semester/~~Repeat/Supplementary/Spl. Supplementary/Old/Annual/Bi-Annual~~)
SUBJECT: **SOIL MECHANICS - II**
(Name in full)
PAPER ××××

Time: ~~Two hours~~/ Three hours/~~Four hours/Six hours~~ **Full Marks ~~30~~/100**
(~~45~~/40 marks for this part)

Use a separate Answer-Script for each part



Supporting Figure 1: Terzaghi's bearing capacity factors (Nc, Nq and Nγ)



Supporting Figure 2: Terzaghi's bearing capacity factors (Nc', Nq' and Nγ')