BACHELOR OF ENGINEERING (CIVIL ENGINEERING)EXAMINATION,2019

(Fourth Year, First Semester Exam)

SOIL MECHANICS-II [PART-I]

Time: Three Hours

Full Marks 100(This part 50)

Question No.	Answer all questions(assume suitable data if necessary)	Marks
1.	A 6-m-high retaining wall is to support a soil with unit weight γ=17.4 kN/m^3, soil friction angle ϕ=26° and undrained shear strength 28.72 kN/m^2. a) Draw the variation of Rankine's active earth pressure on wall with depth b) Determine the depth at which tension crack can occur. c) Determine Rankine active force per unit length of the wall both before and after the tensile crack occurs. d) determine the line of action of the resultant in both cases.	 6 3 8 3
2.	A 6m high embankment is to be constructed over soft clay. Properties of embankment soil and foundation soil are as follows Embankment soil : c=30kPa Φ=17° γ=20kN/m^3 Foundation soil : c=35kPa Φ= 0° γ=18kN/m^3 Inclination of slope : 1V:1.5H 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 calculations.	20
3.	A reinforced concrete tower is provided on a ring foundation of diameter of 12m. The foundation carries a distributed load of 120kN/m^2. Determine the vertical stress distribution at a depth of 6m and 10m below foundation. Use Newmark's chart.	10

Ex/CE/5/T/403/2019

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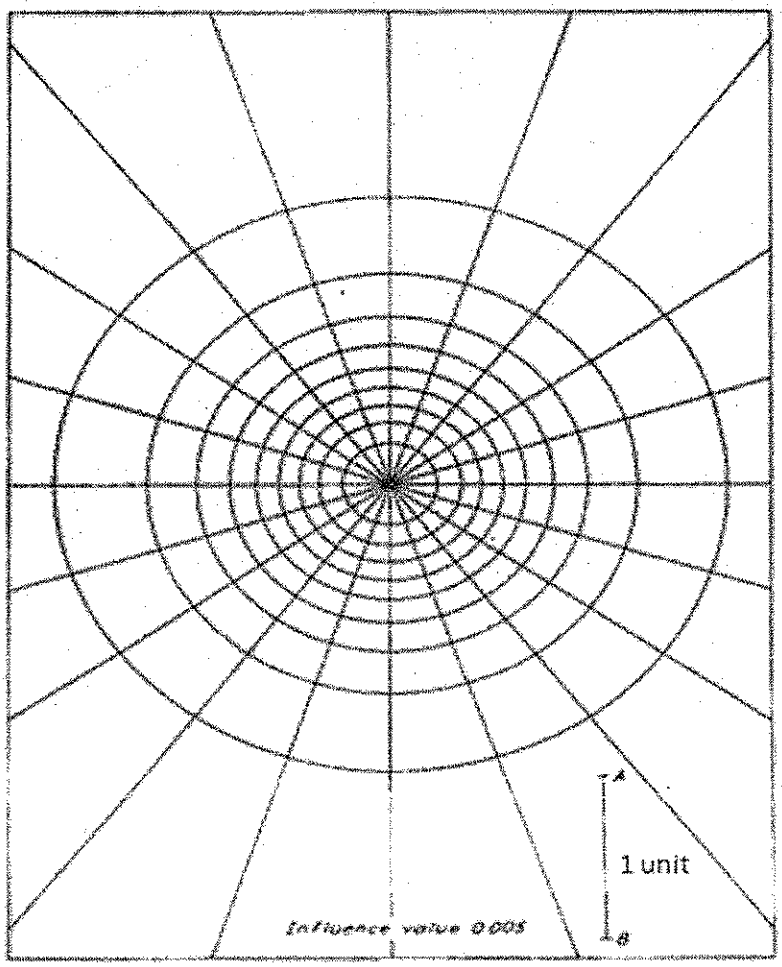

BACHELOR OF ENGINEERING (CIVIL ENGINEERING), 2019

(Fourth Year, First Semester)

SOIL MECHANICS-II

[PART-II]

Time: Three Hours

Full Marks 100
(50 marks for this part)

Question No.	(Answer all the questions.) [Assume any data reasonably if necessary]	Marks
1(a)	(i) Define Net ultimate bearing capacity and Safe bearing capacity.	[2]
	(ii) What are the types of shear failure in soil? Describe load-settlement behavior for each type with neat sketches.	[10]
(b)	Determine the ultimate bearing capacity of a strip footing, 1.5m wide, with its base at a depth of 1m resting on a sand stratum for the following four cases: (i) for dry condition, (ii) GWT located at a depth of 0.6m below the ground surface, (iii) GWT located 0.7m below the base of the footing and (iv) GWT located 2m below the base of the footing (use Terzaghi's theory). [γ_d=17kN/m^3, γ_{sat}=20kN/m^3 φ'=38°, c' = 0]	[10]
2(a)	(i) Discuss briefly about different stages of soil exploration.	[5]
	(ii) Write a short note on wash boring.	[4]
(b)	Define the terms: (i) Inside clearance, (ii) Outside clearance, (iii) Area ratio and (iv) Recovery ratio of a sampler with a neat sketch.	[6]
(c)	(i) What are the types of samplers used in soil exploration? Give example for each type? (ii) Calculate the area ratio for Split Spoon Sampler and comment on the result?	[2+3]
(d)	(i) Write down the expression for N'_{60} and explain each term in it. (ii) For the N values at 3 m and 7.5 m depth mentioned in the table below, find the standard N'_{60} and N'_{70} values for the following soil profile. [take, bore hole diameter = 100mm, Er = 80, loose sand without liner, ignore correction for rod length]	[2+ 6]

φ^o	N_c	N_q	N_γ
35°	57.8	41.4	42.4
40°	95.7	81.3	100.4

Depth (m)	N-value
1.5	7
3.0	12
4.5	17
6.0	20
7.5	21