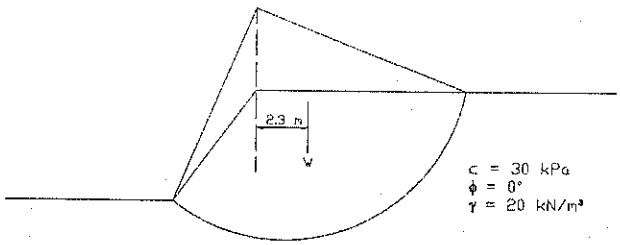
Ref. No. EX/CON/T/312/2019

B. E. CONSTRUCTION ENGINEERING 3RD YEAR 1ST SEMESTER - 2019

SUBJECT: SOIL MECHANICS - II

Time : Three Hours | **Full Marks : 100**

Part I

	Question No.		Marks
CO2	Q1a.	The critical slip circle for a slope is shown below along with the soil properties.  The length of the arc of the slip circle is 15.6m and the area of soil within the slip circle is 82m². The radius of the slip circle is 10.3m. The factor of safety against the slip circle failure is nearly equal to i) 1.05, ii) 1.22, iii) 0.78, iv) 1.28	01
CO1	Q1b.	Which of the following statements is TRUE for degree of disturbance of collected soil sample ? a) Thinner the sampler wall, lower the degree of disturbance of collected soil sample. b) Thicker the sampler wall, lower the degree of disturbance of collected soil sample. c) Thickness of the sampler wall and the degree of disturbance of collected soil sample are unrelated. d) The degree of disturbance of collected soil sample is proportional to the inner diameter of the sampling tube.	01
		State whether the following statements are TRUE or FALSE	
CO1	Q1c.	Auger boring is suitable for sandy soil below water table.	01
CO1	Q1d.	Higher RQD values indicate relatively good quality of rock.	01
CO2	Q1e.	For embankment with clayey soil (ϕ=0), critical height of embankment increases with an increase in slope angle.	01

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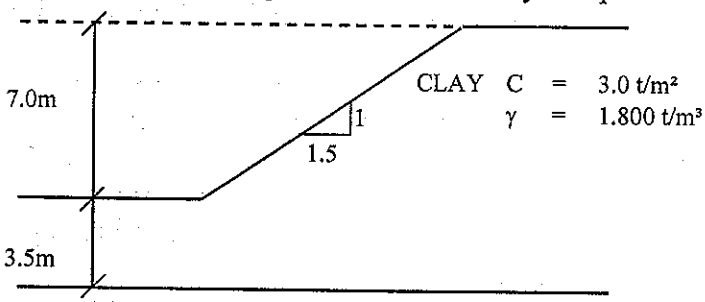
B. E. CONSTRUCTION ENGINEERING 3RD YEAR 1ST SEMESTER - 2019

SUBJECT: SOIL MECHANICS - II

Time : Three Hours **Full Marks : 50**

Part I

	Question No.		Marks
CO2	Q1f.	A long natural slope of cohesiveness soil is inclined at 25° to the horizontal. If $\phi = 30°$, the factor of safety of the slope will be i) 1.24, ii) 0.81, iii) 1.50, iv) 1.75	01
CO2	Q2.	Fig. A gives the details of an embankment made of cohesive soils. Determine the factor of safety against base failure by midpoint circle  **Fig.A**	22
CO1		**Answer any two questions from 3a, 3b and 3c in this block**	
	Q3a.	Write a short note on thin walled tube sampling.	09
	Q3b.	Describe auger boring method. Also state its advantages and disadvantages.	09
	Q3c.	What are the different information to be furnished in a sub-soil investigation report?	09
CO1	Q4.	Briefly discuss the following i) Core Recovery ii) Rock Quality Designation (RQD)	04

B.E Construction Engineering 3rd year 1st Semester Examination 2019

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SOIL MECHANICS -II Part –II Full Marks -50

Answer any two questions

[CO3] Q-1 (a) Determine the depth of excavation without any lateral support in a c-φ soil using the concept of Rankine's earth pressure theory. (8)

(b) Illustrate the boundary conditions in which passive earth co efficient can be expressed as

$K_p = [1 + \text{Sin } \varphi] / [1 - \text{Sin } \varphi]$ (4)

© Explain the significance of field and flow channel in estimation of seepage. (8)

(d) Explain the variation of active and passive earth pressure in a retaining wall in relation to the movement of the wall. (5)

[CO3] Q-2 (a) A retaining wall is shown in Fig-1. Determine the active thrust per meter length of the wall using graphical solution approach for Columb's earth pressure. (20)

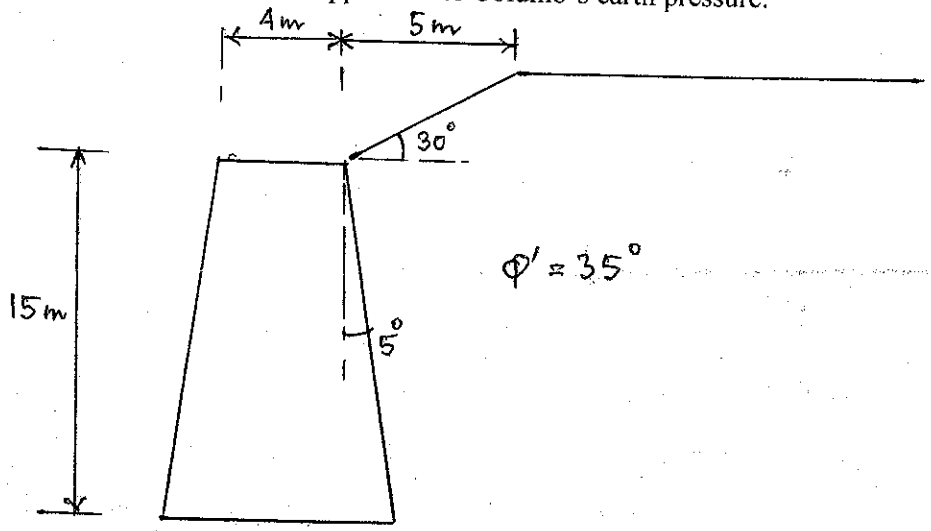

FIG-1

(b) Why the stability of the retaining wall gets adversely affected during earthquake?

[CO4] Q-3(a) Describe the essential requirement of drainage filter and explain how those ensure stability against piping. (10)

(b) Water is flowing @ 0.04 ml/sec in an upward direction through a fine sand layer with a coefficient of permeability of 1×10^{-03} cm/sec. The sample thickness of sand is 10 cm and cross sectional area is 48.0 cm^2. Determine the effective pressure at the middle and bottom section of the sample. (5)

© Explain the significance of phreatic line in an earth dam. (5)

(d) Explain the significance of Darcy's law in seepage analysis. (5)