PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE (AUTONOMOUS) IV B.TECH I SEMESTER END REGULAR EXAMINATIONS, NOV-2022 **GEOTECHNICAL ENGINEERING-II** (CE Branch)

Time: 3 hours

Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

PART-A

Answer all the questions in Part-A (5X2=10M)

Q.No.		Questions	Marks	CO	KL
1.	a)	How will you decide up on the number of borings for a site exploration?	[2M]	1	1
	b)	Define Kp and Ka.	[2M]	2	1
	c)	What is meant by bearing capacity?	[2M]	3	1
	d)	Discuss various types of loads that are to be considered in the design of foundations.	[2M]	4	3
	e)	Sketch the different shapes of well.	[2M]	5	2

PART-B

Answer One Question from each UNIT (5X10=50M)

Q.No.		Questions	Marks	CO	KL			
UNIT-I								
2.	a)	Explain the various geophysical methods of soil exploration and mention	[5M]	1	2			
		their limitations and uses.						
	b)	Explain about Pressure Bulb in detail.	[5M]	1	2			
OR								
3.	a)	Explain different Field tests of soil exploration.	[5M]	1	2			
	b)	Elaborate on types of Penetration Tests of soil investigation Methods.	[5M]	1	2			
UNIT-II								
4.	a)	Elaborate on stability analysis using Swedish arc method.	[5M]	2	4			
	b)	Discuss on Infinite and finite earth slopes in sand and clay.	[5M]	2	2			
OR								
5.	a)	Discuss standard methods slices and Taylor's Stability Number	[5M]	2	4			
	b)	Explain different types of failures concerning stability of slopes.	[5M]	2	2			
UNIT-III								
6.	a)	Explain Culmann's graphical method	[5M]	3	3			
	b)	A 5m high retaining wall supports a clayey backfill with bulk density 18	[5M]	3	4			
		kN/m ³ cohesion c = 30 kN/m ³ and ϕ = 30°.Determine the earth pressure						
		developed per metre length of the wall when wall is pushed towards the						
		backfill and also the point of application.						
OR								
7.	a)	Explain Rankine's theory of lateral earth pressure with its assumptions	[5M]	3	2			
	b)	Discuss the criteria for determination of bearing capacity.	[5M]	3	2			
UNIT-IV								
8.	a)	Describe Coulomb's wedge theory. Explain how maximum active pressure is determined.	[5M]	4	4			

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	b)	A square footing 2 m wide is founded at a depth of 1.4 m in sand. Soil properties are c=0, ϕ = 35°, γ sat = 19 kN/m ³ and unit weight above water table = 17.5 kN/m ³ . Bearing capacity factors are Nq= 41.4 and N γ = 42.4. Determine Ultimate bearing capacity if water table is at i) 3.5 m below ground level ii) 1.4 m below ground level	[5M]	4	3		
OR							
9.	a)	Discuss Terzaghi's bearing capacity theory in detail.	[5M]	4	4		
	b)	Explain the terms Gross ultimate bearing capacity, Net ultimate bearing capacity, Net safe bearing capacity and Allowable bearing capacity.	[5M]	4	2		
UNIT-V							
10.	a)	Design a rectangular combined footing for two columns, each of size 250mmX250mm, the magnitude of column loads being 850kN and 1050kN. c/c distance between columns is 3.8m and a clear spacing of 0.125m only is available beyond the outer face of 850kN column. Take SBC of subsoil as 202kPa.	[5M]	5	5		
	b)	A 50 cm concrete pile is driven in a normally consolidated clay deposit 15 m thick. Cu = 70 kN/m ² , α = 0.9 and Factor of safety is 2.0. Estimate the safe load.	[5M]	5	4		
OR							
11.	a)	Explain the components of a well foundation with a neat sketch	[5M]	5	4		
	b)	A RCC pile weighs 50 kN. It is driven by a single acting steam hammer weighing 40 kN, height of fall is 1 m. Average set/blow is 1.0 cm. Take elastic compression as 1.8 cm. Assuming coefficient of restitution as 0.5. Find safe load on pile. Assume factor of safety of 2.5.	[5M]	5	4		

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