QP Code:RD21BTECH287 | Reg. No | | | | | | | | | | | AY 21

GIET UNIVERSITY, GUNUPUR – 765022

B. Tech (Fifth Semester Regular) Examinations, December – 2023

21BCVPC35003 – Geotechnical Engineering - II

(Common to all branches)

Time: 3 hrs | Maximum: 70 Marks

Answer all questions

(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions	CO #	Blooms Level
a. What is the use of Newmark's chart? Explain the procedure for using the chart.	CO1	K2
b. What is meant by Neutral stress?	CO1	K2
c. Write the formula to determine the settlement from plate load test data for cohesion less soils.	CO2	K2
d. What are the advantages and disadvantages of accessible exploration?	CO3	K2
e. Enumerate the basic types of failure of a finite slope occurrence.	CO4	K2

PART – B **(15 x 4 = 60 Marks)**

Answer ***ALL*** questions	Marks	CO #	Blooms Level
2. a. A uniform pressure acts on a rectangular footing having coordinates [in metres] of corners (0,10), (8,10), (8,0), and (0,0). Find the (m,n) combinations which are to be used for determination of vertical stress at a depth of 8m vertically beneath the point having coordinates (8,12).	7	CO1	K4
b. Compute the vertical stress at a depth of 1.5m vertically beneath the centre of a circular ring type of footing (width of ring=2m; internal diameter=5m) subjected to a uniform pressure of 175 KPa.	8	CO1	K4
(OR)			
c. A water tank is founded on a circular ring type foundation. The ring is of 10 m external diameter and 6m internal diameter. Assuming a uniformly distributed load of 300kPa, determine the vertical pressure at a depth of 6 m below the centre of the foundation.	7	CO1	K4
d. A tank is founded on a circular ring type foundation. The ring is of 12 m external diameter and 6m internal diameter. Assuming a uniformly distributed load of 250kPa, determine the vertical pressure at a depth of 5m below the centre of the foundation.	8	CO1	K4
3.a. Calculate the ultimate net bearing capacity of (i) a strip footing 2 m wide (ii) a square footing 3m x 3 m, and (iii) a circular footing 3 m in diameter. All footings are located on the ground surface and the groundwater level is at the	8	CO2	K4

	ground surface. The soil is medium-dense coarse-grained with γ_{sat} =17 kN/m3 and Ø = 30^0 , Nc = 37.16, Nq = 22.45, Nγ = 19.13			
b.	What are the demerits of plate load test? Explain.	7	CO2	K2
	(OR)			
c.	Compute the allowable bearing capacity of a square footing of 2 m size resting on dense sand of unit weight 20 kN/$m^{3.}$ The depth of foundation is 1 m and the site is subject to flooding. The bearing capacity factors are: Nc = 55, Nq = 38, and Nγ= 45.	8	CO2	K4
d.	Explain the procedure to estimate the pile group capacity in sands and clays.	7	CO2	K2
4.a.	Compute the area ratio of a thin walled tube sampler having an external diameter of 6cm and a wall thickness of 2.25 mm. Would you recommend the sampler for obtaining undisturbed soil samples? Why?	7	CO3	K4
b.	A retaining wall supports a two layered backfill having the following properties: Upper layer: angle of internal friction = 30^0, unit weight = 16KN/m^3 thickness=3m Lower layer: angle of internal friction = 450 unit weight = 20KN/m^3 ; thickness = 2m . Determine the total passive earth pressure.	8	CO3	K4
	(OR)			
c.	A retaining wall with a vertical smooth back is 6 m high. It supports a cohesion less soil (γ = 19kN/m3, ϕ =30˚). The surface of the soil is horizontal and carries a surcharge of 15kPa. Determine the active thrust on the wall.	7	CO3	K4
d.	A 5m high retaining wall supports a clayey backfill with bulk density 18 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.	8	CO3	K4
5.a.	Write the formula to determine the factor of safety (as per method of slices) of a dry finite slope made of C -Ø soil, and explain the terms in it.	7	CO4	K3
b.	Give the step by step procedure of analyzing stability of a finite slope using Swedish circle method.	8	CO4	K4
	(OR)			
c.	With the help of a neat sketch show various forces considered for the analysis of a finite slope using Bishop's simplified method. Mention the equation for factor of safety given by this method.	7	CO4	K3
d.	Derive the equation for factor of safety of an infinite slope when soil is dry and cohesion less. What will happen to the factor of safety when the same slope is under submergence	8	CO4	K4

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