QP Code: RN22BTECH261 | Reg. No | | | | | | | | | | | AR 22

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester - Regular) Examinations, November – 2024

22BCVPC65003 – Geotechnical Engineering-II

(Civil Engineering)

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. Define Boussinesq's influence factor.	CO1	K1
b. How are Caissons classified based on the method of construction?	CO2	K1
c. What steps are to be taken to reduce the harmful effects of settlements?	CO2	K1
d. Define isobar and specify its practical significance.	CO3	K1
e. Explain infinite slopes.	CO4	K2

PART – B **(15 x 4 = 60 Marks)**

Answer ***All*** the questions	Marks	CO #	Blooms Level
2. a. Define & Explain Gross ultimate bearing capacity, Net ultimate bearing capacity, Net safe bearing capacity and Allowable bearing capacity.	8	CO1	K1
b. A concentrated load of 22.5 kN acts on the surface of a homogeneous soil mass of large extent. Find the stress intensity at a depth of 15 meters: (i) directly under the load, and (ii) at a horizontal distance of 7.5 meters. Use Boussinesq's equations.	7	CO1	K2
(OR)			
c. Derive the principle of construction of Newmark's chart and explain its use.	8	CO1	K2
d. Critically differentiate between Boussinesq's theory and Westergaard's theory.	7	CO1	K1
3.a. In a consolidation test the following results have been obtained. When the load was changed from 50 kN/m^2 to 100 kN/m^2, the void ratio changed from 0.70 to 0.65. Determine the coefficient of volume decrease, m_v and the compression index, Cc.	8	CO2	K2
b. Discuss the procedure to determine the safe bearing capacity and settlement from plate load test data.	7	CO2	K1
(OR)			
c. Calculate the safe bearing capacity of a strip footing, 1m wide, in a soil with γ=18kN/m^3, c = 20kN/m^2, and Ø = 20^0 , at a depth of 1m. Terzaghi's bearing capacity factors may be assumed as Nc=8.682, Nq=2.256, Nγ=4.16. Factor of safety against shear failure=3.0	8	CO2	K2
d. A column carries a load of 1000 kN. The soil is a dry sand with density = 19 kN/m^3 and having an angle of internal friction of 40^0. A minimum factor of safety of 2.5 is required and Terzaghi factors are required to be used. (Nγ = 42 and Nq = 21). Find the size of a square footing required if it is placed at 1m below ground surface with water table at ground surface. Assume γ_{sat} = 20kN/m^3 .	7	CO2	K2

4.a.	A soil sample with porosity of 40% has degree of saturation of 50%. Taking specific gravity of soil solids as 2.66, compute dry, saturated, submerged and bulk unit weight of the sample.	7	CO3	K2
b.	A retaining wall with a vertical smooth back is 6 m high. It supports a cohesion less soil (γ = 19kN/m^3, ϕ =30˚). The surface of the soil is horizontal and carries a surcharge of 15kPa. Determine the Active thrust on the wall.	8	CO3	K2
	(OR)			
c.	Describe with a neat sketch how will you carry out the wash boring method of soil exploration? What are its merits and demerits?	8	CO3	K2
d.	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=45^0; unit weight=20KN/m^3 ; thickness= 2m. Determine the total passive earth pressure.	7	CO3	K2
5.a.	State and explain different types of slopes and list the assumptions made in the slope stability analysis.	8	CO4	K1
b.	Explain Swedish circle method for cohesive soil.	7	CO4	K1
	(OR)			
c.	Write critical notes on the friction circle method of analyzing the stability of slopes. An embankment is inclined at an angle of 35^0 and its height is 15 m. The angle of shearing resistance is 150 and the cohesion intercept is 200 kN/m^2. The unit weight of soil is 18.0 kN/m^2. The Taylor's stability number is 0.06, find the factor of safety with respect to cohesion.	15	CO4	K3

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