Register Number:……..

KUMARAGURU
college of technology
character is life

B.E DEGREE EXAMINATIONS: APRIL / MAY 2023

(Regulation 2018)

Sixth Semester

CIVIL ENGINEERING

U18CET6003: Foundation Engineering

COURSE OUTCOMES

CO1: Perform soil investigation work, prepare the soil report and select a suitable type of foundation for the given soil condition.
CO2: Estimate bearing capacity of soil using various theories and by in-situ testing.
CO3: Design the overall dimensions of different types of foundations.
CO4: Assess the behaviour of single pile and group of piles in different types of soils.
CO5: Estimate the earth pressure behind retaining walls and to carry out stability analysis.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Name the sampler used in the standard penetration test (SPT) set up and what kind of soil sample is retrieved from the sampler?	CO1	[K_L]
2.	Differentiate between undisturbed verses disturbed soil samples.	CO1	[K_L]
3.	Why is shape factor incorporated in estimating the bearing capacity of footings other than strip?	CO2	[K_L]
4.	What is settlement and what are the components of it?	CO2	[K_L]
5.	State the conditions when a trapezoidal combined footing is preferred.	CO3	[K_L]
6.	What is strap footing and when is it provided?	CO3	[K_L]
7.	Distinguish between high displacement and no displacement piles.	CO4	[K_L]
8.	What are the demerits of dynamic method of estimating load capacity of piles?	CO4	[K_L]
9.	What is the maximum depth of unsupported vertical cut?	CO5	[K_L]
10.	State the stability checks to be performed in the design of a retaining wall.	CO5	[K_L]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	State and explain in detail all the design features of a good soil sampler to retrieve undisturbed soil samples.	8	CO1	[K_L]
	b)	What is a bore log report? What are the essential points to be mentioned in a bore log report. Draw a typical bore log diagram.	8	CO1	[K_L]

12.	a)	List the factors influencing bearing capacity of soil.	4	CO2	[K$_L$]
	b)	A circular footing 1.5 m diameter is laid at a depth of 1.20 m in a cohesionless soil. Calculate the net ultimate bearing capacity of the soil by I S code method. Take unit weight of soil below water table and above water table as 20 kN/m^3 and 18 kN/m^3 respectively. Consider angle of internal friction of sand is 35^0. Assume N_c = 46.12, N_q = 33.3, N_γ =48.03 and consider S_c =1.3, S_q = 1.2, S_γ = 0.6. Assume the value of depth and inclination factors as unity. What will be the effect on bearing capacity of the soil, when the water table raises to the base of the footing? Consider unit weight of water as 10 kN/m^3.	12	CO2	[K$_L$]
13.	a)	What is a mat foundation? When and where mat foundation is preferred? Also mention the merits of mat foundation.	8	CO3	[K$_L$]
	b)	Explain the step-by-step procedure to design a rectangular combined footing. Also draw the probable loading diagram, shear force and bending moment diagrams.	8	CO3	[K$_L$]
14.	a)	Explain the various classifications of piles in detail.	4	CO4	[K$_L$]
	b)	Compare the overall efficiency of a group of piles arranged in square pattern by i) Conventional method ii) Converse Labarre formula and iii) Feld's rule. Consider the following data. Number of piles: 25 Length of piles: 10 m Diameter of piles: 30 cm Spacing:1.25 m Adhesion factor: 0.70 Unconfined compressive strength of soil at the top and bottom of piles is 70 kN/m^2 and 100 kN/m^2.	12	CO4	[K$_L$]
15.	a)	Estimate the ratio of passive to active earth pressure coefficient for a backfill material having angle of internal friction 28^o.	4	CO5	[K$_L$]
	b)	Estimate the active earth pressure behind a retaining wall of 5.0 m height having angle of internal friction of the backfilled material as 30^o for the top 2.50 m and 32^o for the rest of the portion of the wall. Bulk unit weight and saturated unit weight of soil is 18 kN/m^3 and 20 kN/m^3. Assume the water table is present at a depth of 2.50 m from top of wall and unit weight of water is 10 kN/m^3. Locate the resultant earth pressure. Tabulate the results neatly.	12	CO5	[K$_L$]
16.	a)	Compare the water table correction factors to be used in Terzaghi's bearing capacity formula for two different locations of water table for a shallow footing laid at a depth of 1.2 m from ground level. The width of the footing is 1.5 m. The water table is present at a depth of 0.6 m and 1.5 m from ground level. Present your answer in table format and comment on the same.	8	CO2	[K$_L$]
	b)	Mention the principle of estimating load carrying capacity of a single pile by static and dynamic methods. Which is more dependable?	8	CO4	[K$_L$]

****