O.P.Code: 23CE0130 | R23 | H.T.No.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. III Year II Semester Regular Examinations April-2026
FOUNDATION ENGINEERING
(Civil Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A
(Answer all the Questions **10 x 2 = 20** Marks)

1	a	What are the different stages involved in soil exploration?	CO1	L2	2M
	b	What is hand carved soils sample?	CO1	L1	2M
	c	Define factor of safety w.r.t to cohesion.	CO2	L2	2M
	d	What is Taylor's Stability Number? Write its formula.	CO2	L1	2M
	e	List the types of retaining walls and mention any two stability checks.	CO3	L2	2M
	f	State the basic assumptions of Rankine's theory of earth pressure.	CO3	L2	2M
	g	What is differential settlement?	CO4	L1	2M
	h	List the failure modes of soil under shallow foundations.	CO4	L1	2M
	i	List the common shapes of wells used in practice.	CO5	L1	2M
	j	Define negative skin friction in piles.	CO5	L2	2M

PART-B
(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2		An SPT was conducted at a depth of 3 m in a sand deposit having a unit weight of 19 kN/m³. The water table is located at 1.5 m below ground surface. The observed N-value at 3 m depth was 7. Determine the corrected N-value. At the same site, another SPT was conducted at a depth of 12 m and the observed N-value was 24. Determine the corrected N-value at 12 m depth.	CO1	L4	10M
		OR			
3		Detail the construction features of a split spoon sampler and outline the procedure for obtaining a soil sample using it during field exploration.	CO1	L3	10M

UNIT-II

4		Discuss how the stability of an earth dam is evaluated under different conditions.	CO2	L2	10M
		OR			
5		The shearing strength parameters of the soil are $c' = 26.7$ kN/m², $\Phi' = 15^0$, $C_m' = 26.7$ kN/m² and $\Phi_m' = 12^0$. Calculate the factor of safety (a) with respect to strength (b) with respect to cohesion and (c) with respect to friction. The average inter granular pressure on the failure surface is 102.5 kN/m².	CO2	L4	10M

UNIT-III

6		A cantilever retaining wall of 7mts height retains sand. The properties of sand are e=0.5, $\phi=30^0$ and G=2.7.Using Rankine's theory Determine the active earth pressure at the base when the backfill is (i) dry (ii) saturated(iii)submerged and also the resultant active force in each case.	CO3	L3	10M
		OR			
7		Explain various types of retaining walls with neat sketch.	CO3	L2	10M

UNIT-IV

8	a	Explain the different types of shear failure in soils with suitable diagrams.	CO4	L2	
	b	Determine the ultimate bearing capacity of a strip footing, 1.20 m wide, and having the depth of foundation of 1.0 m. use Terzaghi's theory and assume general shear failure. Take $\phi = 35^0$, $\gamma = 18$ kN/m3, and $C' = 15$ kN/m². Take (Nc=57.8, Nγ=42.4, Nq=41.4).	CO4	L4	
		OR			
9		Discuss the various methods of determination of allowable soil pressure in cohesion less soils.	CO4	L2	

UNIT-V

10		A precast concrete pile (35cm X 35cm) is driven by a single –acting steam hammer. Estimate the allowable load using (a) Engineering News Record Formula (F.S.=6) (b)Hiley Formula (F.S.=4) and (c) Danish Formula (F.S. =4). Use the following data. (i) Maximum rated Energy = 3500kN-m (ii) Weight of hammer = 35kN (iii) Length of pile = 15m (iv) Efficiency of hammer = 0.8 (v) Coefficient of restitution = 0.5 (vi) Weight of pile cap = 3kN (vii) No of blows for last 2.54mm = 6 (viii) Modulus of elasticity of concrete = 2 x 107 kN/m² (ix) Assume any other data, if required. Take the weight of pile as 73.5kN.	CO5	L4	
		OR			
11		Explain various steps involved in sinking operation of wells with neat sketch.	CO5	L2	1

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