Course Code: 20CE0136 **R20**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

Subject with Code: Foundation Engineering (20CE0136) **Course & Branch**: B Tech & CE

Year & Sem: III-B.Tech & I-Sem **Regulation**: R20

UNIT- I
EARTH PRESSURE THEORIES & RETAINING WALLS

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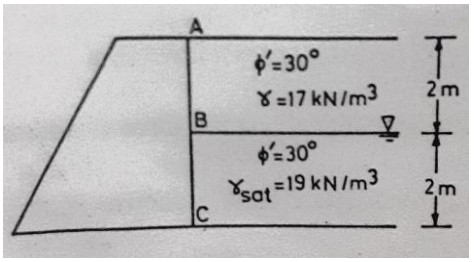
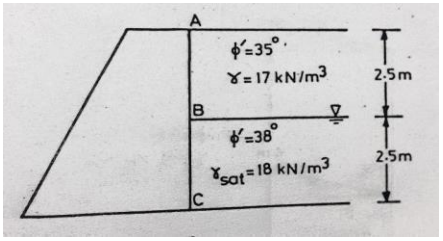
1	Define earth pressure theory and various types of lateral earth pressure with neat sketch.	[L2][CO1]	**[12M]**
2	Determine the lateral earth pressure at rest per unit length of wall as shown in fig. Also determine the resultant earth pressure. Take K_0=1-Sinφ', γ_w=10kN/m^3. 	[L3][CO1]	**[12M]**
3	What are the assumptions of earth pressure theory and derive an expression for Rankines Earth pressure in cohesive soils?	[L2][CO1]	**[12M]**
4	Derive expression for Rehbann's method for the determination of active earth pressure with neat sketch.	[L3][CO1]	**[12M]**
5	Discuss culmann's method for the determination of active earth pressure.	[L3][CO1]	**[12M]**
6	Determine the active pressure on the retaining wall as shown in fig. Take γ_w=10kN/m^3. 	[L3][CO1]	**[12M]**
7	Explain various types of retaining walls with neat sketch.	[L2][CO1]	**[12M]**
8	With the help of neat sketch explain design of gravity retaining walls.	[L2][CO1]	**[12M]**
9	Explain various requirements of stability analysis of Gravity retaining walls.	[L2][CO1]	**[12M]**
10	A cantilever retaining wall of 7mts height retains sand. The properties of sand are e=0.5,φ=30^0 and G=2.7.Using Rankines 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.	[L3][CO1]	**[12M]**

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UNIT –II
SHALLOW FOUNDATIONS & SETTLEMENTS

1	What are different types of shallow foundations? Explain with the help of neat Sketches?	[L2][CO2]	**[12M]**
2	(a) With neat sketches explain different types of shear failures. (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 $\varphi = 35^o$, $\gamma = 18$ kN/m^3, and C' = 15 kN/m^2. Take (N_c=57.8, Nγ=42.4, Nq=41.4)	[L2][CO2] [L3][CO2]	**[6M]** **[6M]**
3	Discuss effect of water table on the bearing capacity of the soil with neat sketch.	[L2][CO2]	**[12M]**
4	a) List out various parameters for choice of type of foundation. b) Write various points to consider for fixing depth of foundation.	[L1][CO2] [L1][CO2]	**[6M]** **[6M]**
5	A strip footing of 2m width is founded at a depth of 4m below the ground surface. Determine the net ultimate bearing capacity, using a) Terzaghi's equation (N_c=5.7, Nγ=1.0, Nq=0.0) b) Skempton's equation c) IS Code (N_c=5.14). The soil is clay ($\varphi=0^0$, C-10kN/m^2).The unit weight of soil is 20kN/m^3.	[L3][CO2]	**[12M]**
6	Describe how the plate load test is conducted with a neat sketch.	[L2][CO2]	**[12M]**
7	What are different types of settlements that occur in a foundation?	[L2][CO2]	**[12M]**
8	Discuss the various methods of determination of allowable soil pressure in cohesion less soils.	[L2][CO2]	**[12M]**
9	Discuss the various methods of determination of allowable soil pressure in cohesion soils.	[L2][CO2]	**[12M]**
10	(a) Determine the ultimate bearing capacity of a square footing, resting on the surface of saturated clay of unconfined compressive strength of 98kN/m^2. (b)A rectangular footing (3 m X 2 m) exerts a pressure of 100 kN/m^2 on a cohesive soil (E_s =5x10^4 and μ=0.50).Determine the immediate settlement at the centre, assuming a) Footing is flexible b) Footing is rigid.	[L3][CO2] [L3][CO2]	**[6M]** **[6M]**

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UNIT –III
PILE FOUNDATIONS

1	Define pile foundation. Detail about necessity of pile foundation.	[L1][CO3]	**[12M]**
2	List out various classifications of pile foundations. Discuss different methods for installation of piles	[L2][CO3]	**[12M]**
3	How would you estimate the load carrying capacity of a pile in (a) cohesion less soils (b) Cohesive soils by using static methods?	[L2][CO3]	**[12M]**
4	How would you estimate the load carrying capacity of a pile by using dynamic formulae?	[L2][CO3]	**[12M]**
5	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 resistitution = 0.5 (vi) Weight of pile cap = 3kN (vii) No of blows for last 2.54mm = 6 (viii) Modulus of elasticity of concrete = 2×10^7 kN/m^2 Assume any other data, if required. Take the weight of pile as 73.5kN.	[L3][CO3]	**[12M]**
6	Explain in detail In-situ penetration tests for pile capacity.	[L1][CO4]	**[12M]**
7	a) A 30cm diameter concrete pile is driven into a homogeneous consolidated clay deposit (c_u=40kN/m^2, α=0.7).If the embedded length is 10m, estimate the safe load (F.S. =2.5).	[L3][CO4]	**[6M]**
	b) A square concrete pile (30cm side) 10 m long is driven into coarse sand (γ=18.5 kN/m^3, N=2.0). Determine the allowable load (F.S. =3.0).	[L2][CO4]	**[6M]**
8	How would you estimate the group action of piles in (a) sand (b) clay?	[L2][CO4]	**[12M]**
9	Describe how the pile load test is conducted with a neat sketch.	[L2][CO4]	**[12M]**
10	Explain settlement of pile groups in (a) cohesion less soils (b) cohesive soils.	[L2][CO4]	**[12M]**

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UNIT –IV

WELL FOUNDATIONS & CAISSON FOUNDATION

1	Explain different shapes of wells with neat sketch.	[L1][CO5]	**[12M]**
2	Discuss various forces acting on well foundation.	[L1][CO5]	**[12M]**
3	What are the various components of well foundations? What are its uses?	[L1][CO5]	**[12M]**
4	Explain various steps involved in sinking operation of wells with neat sketch.	[L2][CO5]	**[12M]**
5	Explain various measures for rectification of Tilts and Shifts with neat sketch.	[L2][CO5]	**[12M]**
6	Explain the construction of open caisson with the help of neat sketch.	[L2][CO5]	**[12M]**
7	Describe the various components of pneumatic caisson with the help of neat sketch.	[L2][CO5]	**[12M]**
8	Explain the construction of Floating caisson with the help of neat sketch.	[L2][CO5]	**[12M]**
9	What are the advantages and disadvantages of pneumatic caisson over open caisson?	[L1][CO5]	**[12M]**
10	What are the advantages and disadvantages of Floating caisson and discuss stability of floating caisson during flotation?	[L1][CO5]	**[12M]**

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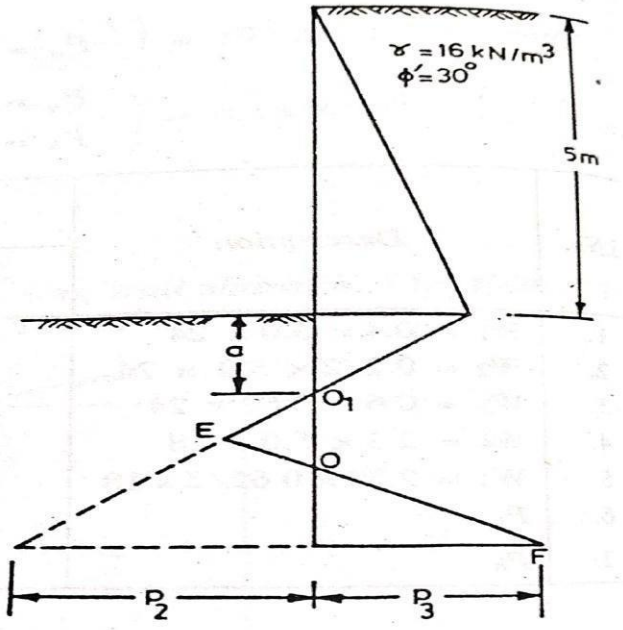
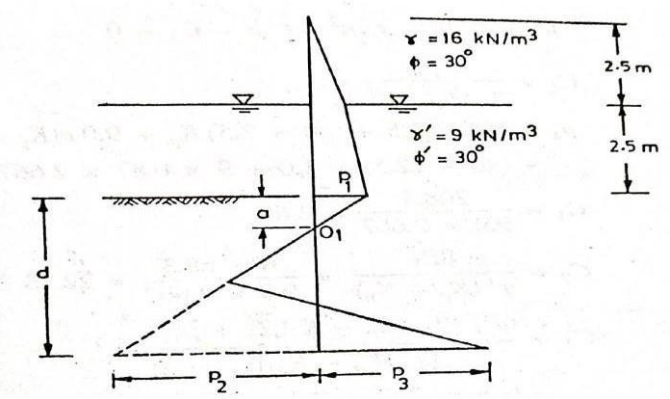
UNIT –V
SHEET PILE WALLS

1	What are different types of sheet pile walls? Explain with neat sketch.	[L1][CO6]	**[12M]**
2	Explain the pressure distribution and stability of free cantilever sheet pile with neat sketch.	[L3][CO6]	**[12M]**
3	Explain in detail the pressure distribution of cantilever sheet pile in cohesion less soils with neat sketch.	[L3][CO6]	**[12M]**
4	Explain in detail the pressure distribution of cantilever sheet pile penetrating clay with neat sketch.	[L3][CO6]	**[12M]**
5	Explain the stability of anchored sheet piles with free earth support with neat sketch.	[L2][CO6]	**[12M]**
6	Explain in detail Rowe's moment reduction curves.	[L2][CO6]	**[12M]**
7	Explain the procedure used in the analysis of the sheet pile with fixed earth support with neat sketch using equivalent beam method.	[L2][CO6]	**[12M]**
8	What are different anchors used in sheet pile walls? Explain the design of anchor pates and beams with neat sketch.	[L2][CO6]	**[12M]**
9	Determine the required of penetration of the cantilever sheet pile as shown in fig.Take γ=16kN/m^3. 	[L3][CO6]	**[12M]**

10	Determine the depth of penetration of the cantilever sheet pile as shown in fig. The water level on both sides is the same.	[L3][CO6]	**[12M]**



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