

**SIDDARTHA INSTITUTE OF SCIENCE AND TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**

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QUESTION BANK (DESCRIPTIVE)

Subject with Code: Foundation Engineering (19CE0130)

Course & Branch: B Tech & CE

Year & Sem: IV-B.Tech & I-Sem

Regulation: R19

UNIT- I

EARTH PRESSURE THEORIES & RETAINING WALLS

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 $K_0=1-\sin\phi'$, $\gamma_w=10\text{kN/m}^3$.	[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 Rehmann'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 $\gamma_w=10\text{kN/m}^3$.	[L3][CO1]	[12M]
7	Explain various types of retaining walls with neat sketch.	[L2][CO2]	[12M]
8	With the help of neat sketch explain design of gravity retaining walls.	[L2][CO2]	[12M]
9	Explain various requirements of stability analysis of Gravity retaining walls.	[L2][CO2]	[12M]
10	A cantilever retaining wall of 7mts height retains sand. The properties of sand are $e=0.5, \phi=30^0$ and $G=2.7\text{m}$. 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][CO2]	[12M]

UNIT –II
SHALLOW FOUNDATIONS & SETTLEMENTS

1	What are different types of shallow foundations? Explain with the help of neat Sketches?	[L2][CO3]	[12M]
2	(a) With neat sketches explain different types of shear failures.	[L2][CO3]	[6M]
	(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 $\phi = 35^\circ$, $\gamma = 18 \text{ kN/m}^3$, and $C' = 15 \text{ kN/m}^2$. Take ($N_c=57.8$, $N_\gamma=42.4$, $N_q=41.4$)	[L3][CO3]	[6M]
3	Discuss effect of water table on the bearing capacity of the soil with neat sketch?	[L2][CO3]	[12M]
4	a) List out various parameters for choice of type of foundation.	[L1][CO3]	[6M]
	b) Write various points to consider for fixing depth of foundation.	[L1][CO3]	[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 ($N_c=5.7$, $N_\gamma=1.0$, $N_q=0.0$) b) Skempton's equation c) IS Code ($N_c=5.14$). The soil is clay ($\phi=0^\circ$, $C=10\text{kN/m}^2$). The unit weight of soil is 20kN/m^3 .	[L3][CO3]	[12M]
6	Describe how the plate load test is conducted with a neat sketch?	[L2][CO3]	[12M]
7	What are different types of settlements that occur in a foundation?	[L2][CO3]	[12M]
8	Discuss the various methods of determination of allowable soil pressure in cohesion less soils?	[L2][CO3]	[12M]
9	Discuss the various methods of determination of allowable soil pressure in cohesion soils?	[L2][CO3]	[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 .	[L3][CO3]	[6M]
	(b) A rectangular footing (3 m X 2 m) exerts a pressure of 100 kN/m^2 on a cohesive soil ($E_s = 5 \times 10^4$ and $\mu=0.50$). Determine the immediate settlement at the centre, assuming a) Footing is flexible b) Footing is rigid.	[L3][CO3]	[6M]

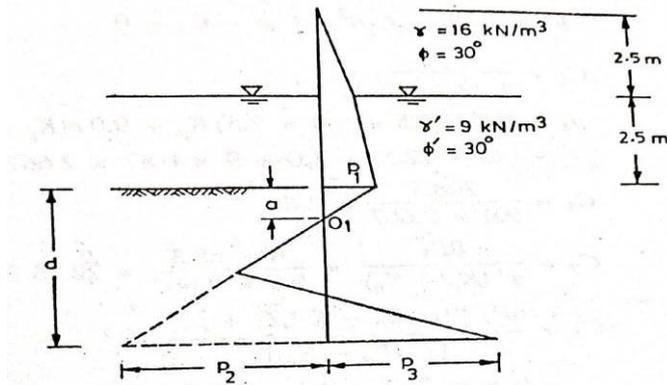
UNIT –III
PILE FOUNDATIONS

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

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]

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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