

B. E. CONSTRUCTION ENGINEERING 3RD YEAR 2ND SEMESTER - 2019**SUBJECT: UNDERGROUND CONSTRUCTION**

Time : Three Hours

Full Marks : 100

Part I

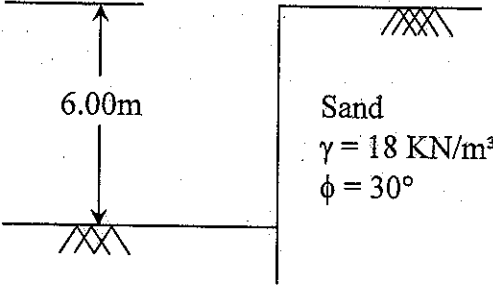
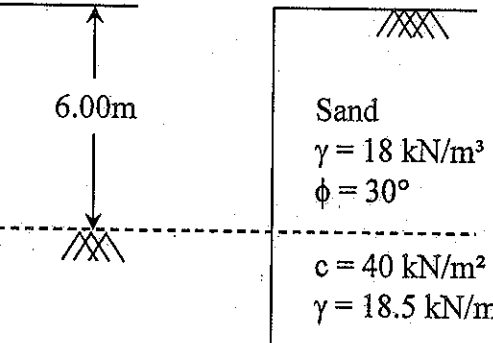
Question No.		Marks
CO2 [15]	Answer any one from question (1) and question (2) in this block	
Q1.a.	Describe the method of dewatering by SUMPS	10
Q1.b.	Explain the purpose of construction of Guide wall in case of diaphragm wall construction	05
Q2.a.	State whether the following statements are TRUE or FALSE	05
	i) Straight web type sheet piles are suitable for construction of cofferdam	
	ii) Passive earth pressure generates on the backfill side of sheet pile wall above dredge line	
	iii) Boiling of sand is a possibility if clayey strata exist at the bottom of a deep excavation	
	iv) Elaborate dewatering arrangement is required if the co-efficient of permeability of soil is greater than 1×10^{-3} cm/sec.	
	v) Deep well pumping method of dewatering is suitable in case of clayey soil strata.	
Q2.b.	Write a short note on location of anchorages in case of anchored sheet pile wall	05
Q2.c.	Briefly discuss the different uses of diaphragm wall	05

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Question No.		Marks
CO5 [25]	<p>Answer any one from question (3a) and question (3b) in this block</p>	
Q3a.	<p>Find the depth of embedment below the dredge line for the cantilever sheet pile shown in Fig.A Apply 30% increase to the computed embedment depth.</p>  <p style="text-align: center;">Fig.A</p>	25
Q3b.	<p>Find the depth of embedment below the dredge line for the cantilever sheet pile shown in Fig.B Apply 30% increase to the computed embedment depth.</p>  <p style="text-align: center;">Fig.B</p>	25
CO6 [10]	Q4. Write a short note on ground settlement in sandy strata	10

REFERENCE NUMBER : EX/ CON / T /324/2019

B.E.CONSTRUCTION ENGINEERING 3rd YEAR 2nd SEMESTER EXAMINATION 2019

UNDERGROUND CONSTRUCTION

FULL MARKS: 50 PART- II

Answer any two questions

[CO1] Q-1(a) Determine the lateral earth pressure in deep cut in granular soil using Terzaghi's concept. How it is conceptually different from the theory of estimation of lateral earth pressure on retaining wall. (10+4)

(b) Describe different types of earth pressure diagrams for deep cut in clay and sand. (6)

© Find out the depth of cut in $c-\phi$ soil beyond which bracing system is necessary. (5)

[CO2] Q-2(a) A braced cut 8m wide 10m deep is to be made with RCC diaphragm wall in a layered clay subsoil followed by sandy layer with ground water table at a depth of 2.5 m b.G.L. The top clay layer starts from e.G.L and continues up to 8.0 m b.G.L with $C = 2.5 \text{ t/m}^2$, $\phi = 0$, $\gamma = 1.84 \text{ t/m}^3$. The second clay layer starts after the first layer and extends up to a depth of 15.0 m b.G.L, with $C = 4.0 \text{ t/m}^2$, $\phi = 0$, $\gamma = 1.86 \text{ t/m}^3$, resting on a medium sand layer with $\gamma = 1.89 \text{ t/m}^3$.

Check the stability of the cut against base failure, bottom heave and clay bursting. Suggest the remedial measure for the stability of the cut, if found unsafe in either of the checks. (15)

Draw the apparent earth pressure diagram on the diaphragm wall and estimate the maximum load on each strut, if the struts are placed @3.75 m c/c along the length of the cut and the maximum spacing of struts in vertical direction is 3.5 m. (10)

[CO3] Q-3(a) Determine the design vertical stress on the top of a ditch conduit and explain the significance of the term 'load coefficient'. (10)

(b) Explain the procedure for estimation of load on tunnel roof and floor in a deep tunnel in sandy deposit. (9)

© Briefly explain the process of arching with earth pressure diagram. (6)