B. E. CONSTRUCTION ENGINEERING 4TH YEAR 2ND SEMESTER - 2017
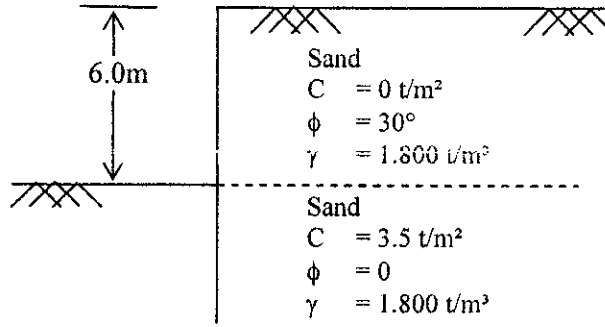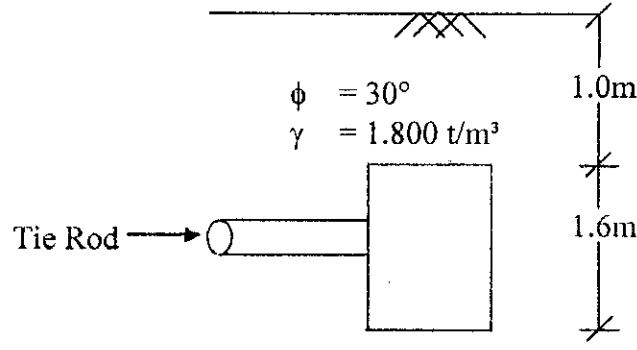
Subject Underground Construction   Time : Three hours   Full Marks : 100

Part I

Use Separate Answer scripts for each Group

No of Questions		Marks
	Answer any **two** questions.	
Q1	Find the depth of embedkment below the dredge line for the cantilever sheet pile shown in Fig. A. Apply 30% increase to the computed embedment depth	25

6.0m

Sand
C = 0 t/m²
ϕ = 30°
γ = 1.800 t/m²

Sand
C = 3.5 t/m²
ϕ = 0
γ = 1.800 t/m³

Fig. A

Q2a.	Describe the method of dewatering by well point method.	10
Q2b.	Find out the safe working load for the anchor block of size 1.6m x 1.6m located as shown in Fig. B. the spacing of anchor block is 3.25m.	05

ϕ = 30°   1.0m
γ = 1.800 t/m³

Tie Rod   1.6m

Fig. B

Q2c.	Write a short note on ground settlement in clayey strata.	10
Q3a.	State the different uses as well as advantages of Diaphragm walls.	10
Q3b.	Describe in brief the successive panel method of construction of diaphragm wall.	06
Q3c.	i) State the uses of cofferdam ii) Describe in brief different types of cofferdam.	09

Answer any two questions.

Assume relevant data if required.

Q-1(a) Determine the earth pressure on braced cut using Terzhaghi's theory in C-ϕ soil. (15)

(b) Describe the factors on which the performance of braced cut depends significantly. (5)

© Determine the depth up to which excavation can be made in C-ϕ soil . (5)

Q-2(a) A braced cut (9m wide and 12 m deep) is to be made with steel sheet pile in a stratified soil deposit as described below. The first layer at proposed site consists of soft grey silty clay C= 3 t/m^2, $\square$= 1.85 t/m^3 which extends up to 12.0 m b.g.l is followed by a stiff clay layer C= 6.0 t/m^2, $\square$= 1.88 t/m^3 up to a depth of 20.0 m b.g.l . The third layer is a medium sand with N= 15. The ground water table is at a depth of 3.5 m b.g.l. Determine the vertical and horizontal spacing of struts required for stability of the bracing system if the allowable load on each strut is 110 ton. (10)

(b).(i) Classify different types of conduits . (ii) Explain with line diagrams.(iii) Mention at least one examples of each types of conduit. (9)

© Explain the principle of transforming an unsafe cut to safe one against clay bursting. (6)

Q-3(a) A tunnel (6 m wide and 8 m deep) is passing through 48 m below the river bed level through a soil having ϕ= 28 degree, Y = 1.88 t/m^3. Determine the load on tunnel roof and tunnel wall. The depth of water above river bed may be considered as 8.0 m. (12)

(b) Explain Martson formula in relation to design of projecting conduits. (6)

© Describe different types of primary , secondary and tertiary members with reference to bracing system in cut. (7)