GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

ROLL NO.	

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 40 Max Time: 120 Mins Weightage: 40 %

END TERM FINAL EXAMINATION

I Semester AY 2017-2018 Course: **CIV 214 Foundation Engineering** 20 DEC 2017

Instructions:

i. Write legibly
ii. Scientific and non-programmable calculators are permitted.

Part A

(2Q x 4 M= 8Marks)

1. What are the different components of settlements for shallow footing? What is meant by flexible and rigid footing?
2. Classify the Pile foundations on different basis (in a tabular column).

Part B

(4 Q x 4 M= 16 Marks)

3. A rectangular footing 3m x 1.5m exerts a pressure of 80KN/m^2 on a cohesive soil (Es = 5.1x 10^4 KN/m^2, μ =0.50).Determine the immediate settlement at the center, assuming the footing is (a) flexible and (b) rigid. Flexible influence factors for L/B = 2 are 1.53 at the center and 0.77 at the corner and for rigid it is 0.8.
4. A concrete Pile 50cm in diameter and 20m long is driven into a homogeneous mass of clay soil of medium consistency. The water table is at the ground surface. The unit cohesion is 45 KN/m^2 and adhesion factor a = 0.70.Compute Q_u and Q_a with FS 2.5.
5. A square pile group of 16 piles, 12m long, passed through a filled up soil of 4m depth. The pile diameter is 300mm and the pile spacing is 800mm.If unit cohesion of the material is 18 KN /m^2 and the unit weight is 15KN/m^3 compute the negative skin friction of the group.
6. A pile of 0.45m diameter is driven in saturated loose sand as shown in the figure 1. Estimate the ultimate load carrying capacity from static formula.

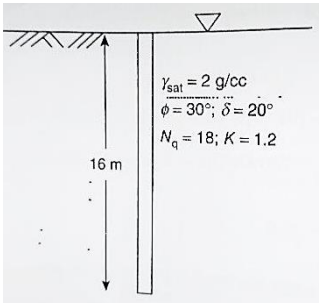


Figure 1

Part C

(2 Q x 8M= 16 Marks)

7. Calculate the total consolidation settlement of soil profile as shown in figure 2, composed of two different types of clay, ie clay 1 and clay 2 due to 150 kpa net foundation loading. Take unit weight of water as 10 KN/m^3 and assume that Skempton-Bjerrum correction factor μ = 0.7 for both clay layers. Note that Pc is the preconsolidation pressure.

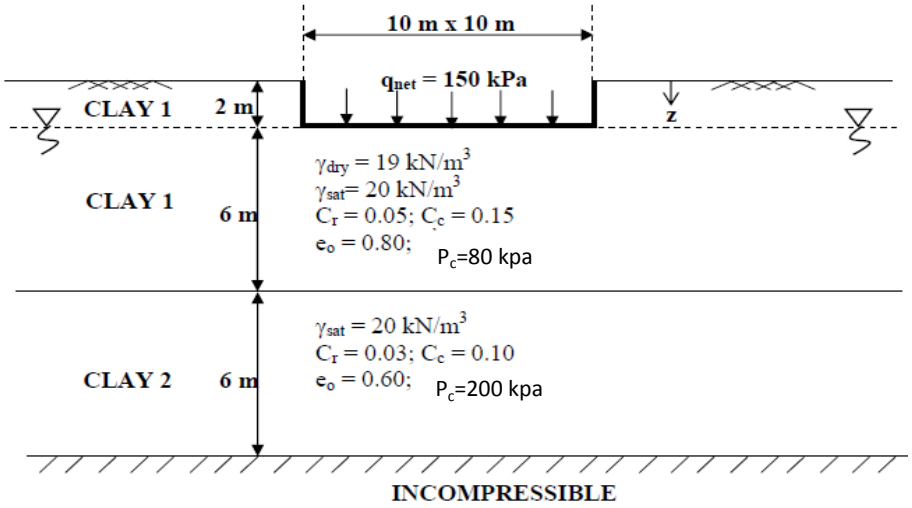


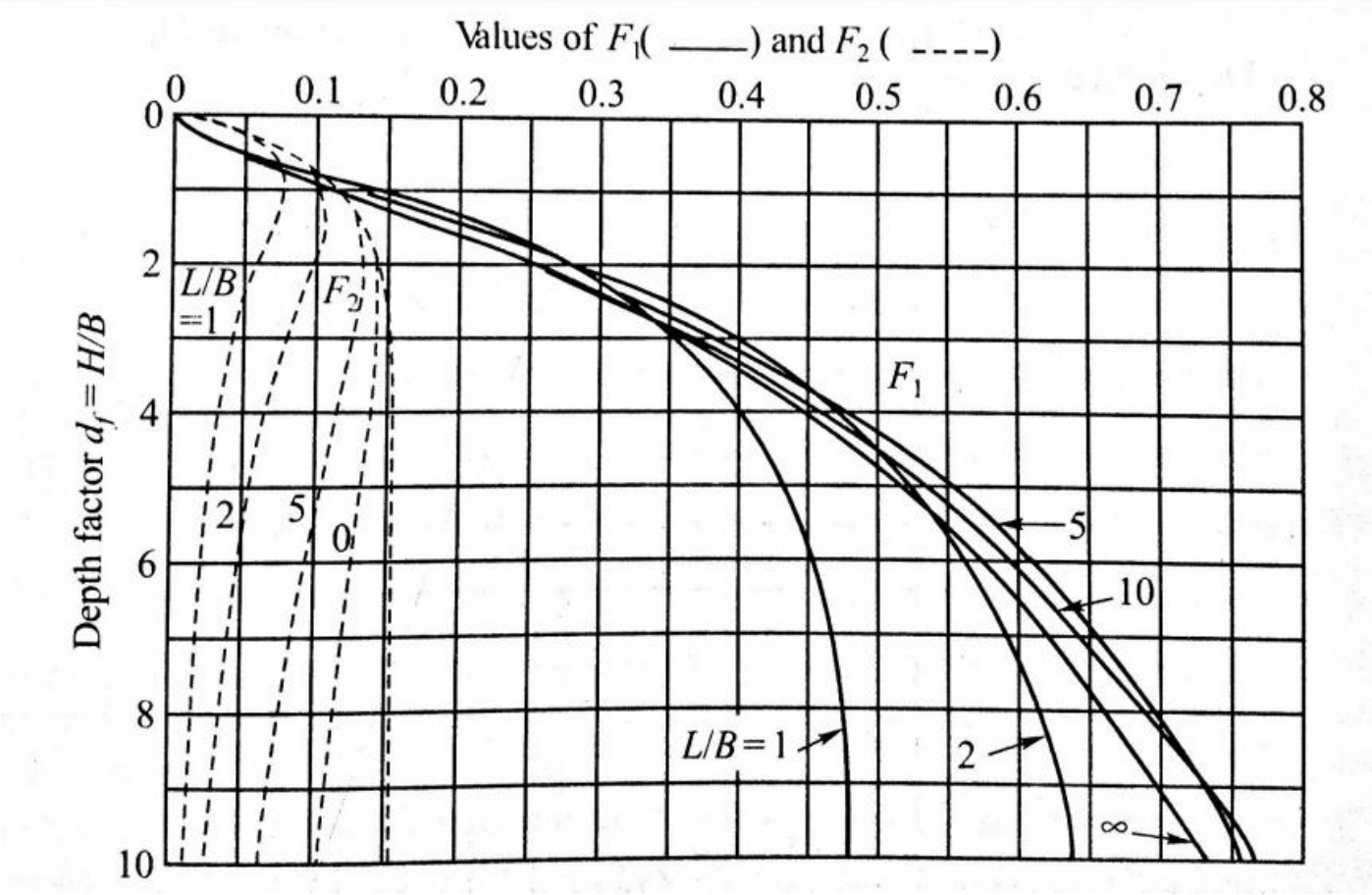
Figure 2

8. A square footing of size 10m x 10m is founded at a depth of 2m below the ground surface in loose medium dense sand with q_n = 120 KN/m^2.Standard penetration tests conducted at the site gave the following N_{60} values:

Depth below GL in m	N_{60}	Depth below GL in m	N_{60}
2	8	12	16
4	8	14	18
6	12	16	17
8	12	18	20
10	11		

The water table is at the base of the foundation. Above the water table, γ = 16.5KN/m^3 and submerged γ_b = 8.5 KN/m^3.Compute the elastic settlement by using, E_s =250(N_{corr}+15) for computing the modulus of elasticity of the sand. Assume μ=0.3 and depth of compressible layer = 2B =20m (=H)

REFERENCE FIGURE FOR QUESTION 8



PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 20 | Max Time: 60 Mins | Weightage: 20 %

TEST 2

I Semester 2017-2018 | Course: **CIV 214 Foundation Engineering** | 25 OCT 2017

Instructions:

i. Write legibly
ii. Scientific and non-programmable calculators are permitted.

Part A

(2Q x 3 M= 6 Marks)

1. What are the different modes of failure of finite slopes? Explain with diagram.

2. What are the different types of bearing capacity failure? Explain with a diagram.

Part B

(2 Q x 4 M= 8 Marks)

3. A laboratory test gave the following soil parameters C= 35 KN/m^2, $\phi = 32^o$ The expected parameters of the mobilized shearing resistance are C_m = 20 KN/m^2, $\phi_m = 25^o$ .The average effective pressure on the failure plane is 165 KN/m^2.Find the factors of safety w.r.t average shearing strength, cohesion and internal friction

4. A square footing 3m x 3m is built on a homogeneous bed of sand of density 19KN/m^3 and having $\phi = 35^0$.The depth of foundation is 1.5m below the ground. Determine the safe load that can be applied on the footing with F.O.S of 3.0 considering N_c =57.8, N_q = 41.4 and N_γ =42.4 as the bearing capacity factors for analysis.

Part C

(1 Q x 6 M= 6 Marks)

5. An embankment is to be constructed with C = 25KN/m^2, $\phi = 25^o$, γ=19 KN/m^3, Fc = 1.3, height H =12m.Estimate the side slope required. Taylor's stability numbers are as follows for slope angle.

Slope Angle	90	75	60	45	30	20	10
S_n	0.182	0.134	0.097	0.062	0.025	0.005	0

Also find the factor of safety if the slope angle is 1 V: 2 H, given $\phi = 25^o$

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 40 | Max Time: 60 Mins | Weightage: 20 %

TEST 1

I Semester 2017-2018 | Course: **CIV 214 Foundation Engineering** | 20 SEPT 2017

Instructions:

i. Write legibly
ii. Scientific and non-programmable calculators are permitted.

Part A

(4Q x 5 M= 20 Marks)

1. How is standard penetration test conducted in the field? Explain with a neat diagram
2. How is the depth and lateral extent of soil exploration determined?
3. With a neat sketch of soil sampler, define (1) Area ratio (ii) Recovery ratio (iii) Inside clearance (iv) Outside Clearence.
4. Compare Boussinesq's and Westergaard's theory.

Part B

(2 Q x 7 M= 14 Marks)

5. Calculate the stress by point load method of Boussinesq at a depth of 20m below the centre of a raft of size 30 x 12 m founded at a depth of 2.5m subjected to a uniform pressure of 150KN/m^2.Neglect the effect of founding depth. Assume coordinate of the centre of the raft is (0,0)

6. What is meant by SPT 'N' value?
   A single concentrated load of 1000 KN acts at the ground surface. Construct an isobar for σ_z = 40 kN/m^2 by making use of the Boussinesq equation.

Part C

(1 Q x 6 M= 6 Marks)

7. ABCD is a raft foundation of a multi-storey building as shown in Figure 1

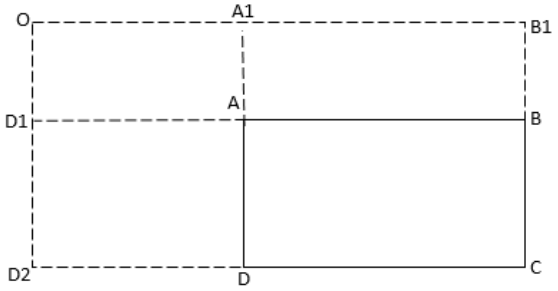


Figure 1

Where AB = 20 m, BC =12m, the udl q over raft is 350KN/m^2.Determine σ_z at a depth of 6m below point O where AA_1 = 4m, A_1O = 6m.

FADUM'S CHART

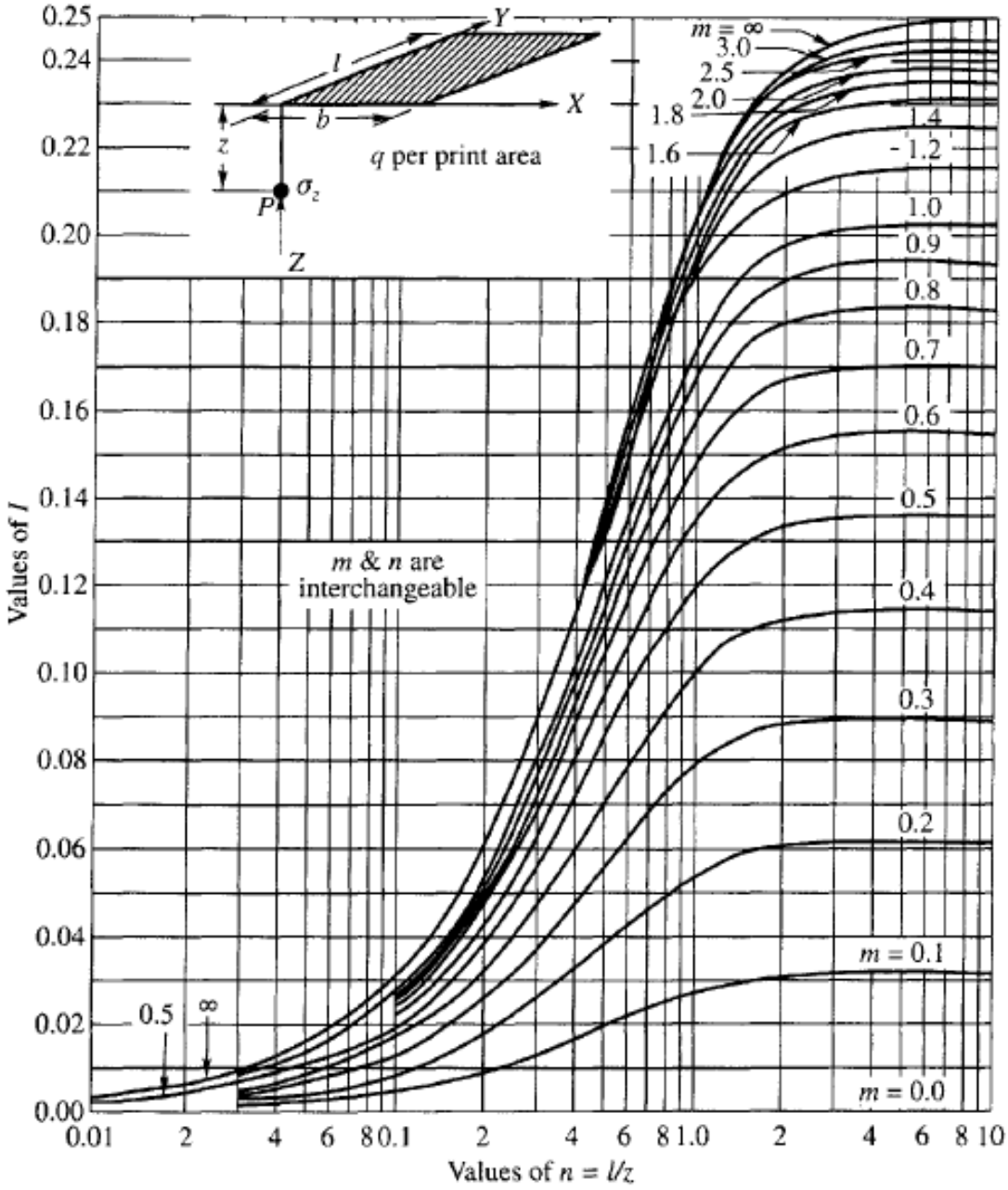


Figure 2