



**SHANTILAL SHAH ENGINEERING COLLEGE, BHAVNAGAR**  
**APPLIED MECHANICS DEPARTMENT**

Title of Subject	:	Foundation Engineering (Elective)	Date: 09/02/2022
Subject Code	:	3160616	
Assignment No	:	01	
Assignment Title	:	Selection of foundation and Sub-soil Exploration / Investigation	

**Instructions:**

**All are informed to write assignment in file pages.**

Q:-1 Explain the objectives of surface exploration.

Q:-2 What is reconnaissance? What type of information is obtained in reconnaissance?

Q:-3 Describe the split spoon sample. What is its use?

Q:-4 Describe the static cone penetration test. What are its limitations?

Q:-5 How would you conduct an in-situ vane shear test ? What is its use?

Q:-6 Discuss various factors affecting sample disturbance.

Q:-7 Discuss the various soil samplers used for obtaining undisturbed soil sample.

**Note: Last Date to submit assignment is 15/04/2022.**



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Title of Subject	:	Foundation Engineering (Elective)	Date: 09/02/2022
Subject Code	:	3160616	
Assignment No	:	02	
Assignment Title	:	Shallow Foundation	

**Instructions:**

**All are informed to write assignment in file pages.**

Q:-1 Explain "types of shear failure of soil" with sketches.

Q:-2 Explain clearly effect of ground water table on the safe bearing capacity of soil.

Q:-3 Describe plate load test with neat sketches.

Q:-4 Explain "floating foundation".

Q:-5 Disc the effect of shape of foundation on bearing capacity.

Q:-6 List factors affecting selection of pavement.

Q:-7 A footing, 2 m square, rests on a soft clay soil with its base at a depth of 1.5 m from the ground surface. The clay stratum is 3.5 m thick and is underlain by a firm sand stratum. The clay soil has the following properties: LL = 30%; wn = 40%; Gs = 2.70;  $\mu = 0$ ; cu = 50 kPa. It is known that the clay stratum is normally consolidated (NC). Using Skempton's equation, determine the net safe bearing capacity of the footing. Compute the settlement that would result if this load intensity were allowed to act on the footing. Natural water table is quite close to the ground surface.

Q:-8 The following observations relate to a plate load test conducted on a 30 cm square test plate placed at a depth of 1.5 m in a cohesionless soil deposit: (Note: 1 kg/cm<sup>2</sup>  $\approx$  100 kPa)

Intensity of load (kg/cm <sup>2</sup> )	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
Settlement (mm)	0	2.0	4.0	7.0	11.0	16.0	23.0	32.0	45.0

Plot the load-settlement curve:

(a) Determine the allowable bearing pressure for a 2 m square footing for a minimum FS of 2.5 with respect to shear failure and a maximum permissible settlement 25 mm. Water table is at a depth of 2 m below the ground surface. What will be the actual factor of safety with respect to shear failure at the allowable bearing pressure?

(b) If the water table reaches up to the ground surface due to unanticipated reasons, what will be the new value of FS? What settlement can be expected now?

Q:-9 Describe Skempton's analysis for bearing capacity of cohesive soils.

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Title of Subject	:	Foundation Engineering (Elective)	Date: 09/02/2022
Subject Code	:	3160616	
Assignment No	:	03	
Assignment Title	:	Pile foundations	

**Instructions:**

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Q:-1 Discuss various dynamic formula. What are their limitations?

Q:-2 What is negative skin friction? What is its effect on the pile?

Q:-3 Explain in detail the types of failure of pile group.

Q:-4 Write short note on group action and efficiency of pile group.

Q:-5 How do you estimate the group capacity of piles in sand and clay?

Q:-6 What is "adhesion factor"? Why it is used for piles in sand and clay?

Q:-7 A 30 cm diameter concrete pile is driven into a homogeneous consolidated clay deposit ( $CU = 40$  kN/m<sup>2</sup>,  $\alpha = 0.7$ ). If embedded length is 10 m estimate safe load on pile, factor of safety is 2.5.

Q:-8 A reinforced concrete pile weighting 30 kN (inclusive of helmet and dolly) is driven by a drop hammer weighting 40 kN and having an effective fall of 0.8 m. The average penetration per blow is 14 mm. The total temporary elastic compression is 18 mm. Assuming coefficient of restitution as 0.25 and factor of safety as 2, determine the ultimate load and allowable load for the pile use Hiley's formula.

Q:-9 A 40 cm square pre-cast RCC pile is driven by 9 m into a sandy bed. The standard penetration test result, performed on this ground are given below.

Depth(m)	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0
SPT-N values	4	6	12	12	20	24	35	39

Compute the factor of safety available if 1100 kN of compressive load is applied on this pile.

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Title of Subject	:	Foundation Engineering (Elective)	Date: 09/02/2022
Subject Code	:	3160616	
Assignment No	:	04	
Assignment Title	:	Foundations on problematic soil & Introduction to Geosynthetics	

**Instructions:**

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Q:-1 Write short note on Expansive Soils.

Q:-2 Write short note on Under Reamed Pile foundation.

Q:-3 Write short note on Geosynthetics types and Uses.

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Title of Subject	:	Foundation Engineering (Elective)	Date: 09/02/2022
Subject Code	:	3160616	
Assignment No	:	05	
Assignment Title	:	Retaining walls	

**Instructions:**

**All are informed to write assignment in file pages.**

Q:-1 Write short note on

- (1) Counter Fort Retaining Wall
- (2) Gravity Wall
- (3) Diaphragm Wall
- (4) Sheet Piles Wall

**Note: Last Date to submit assignment is 15/04/2022.**