

DESIGN OF SHALLOW FOUNDATION
(SETTLEMENT)

QUESTION 1

A square foundation (1.8 m x 1.8 m) is resting on a sand deposit. The net load per unit area at the level of the foundation is 190 kN/m^2 . For the sand, $u_s = 0.35$, $E_s = 16000 \text{ kN/m}^2$, $D_f = 1.2 \text{ m}$. There is a rock layer at 5 m below the foundation level.

Determine the elastic settlement that the foundation would undergo.

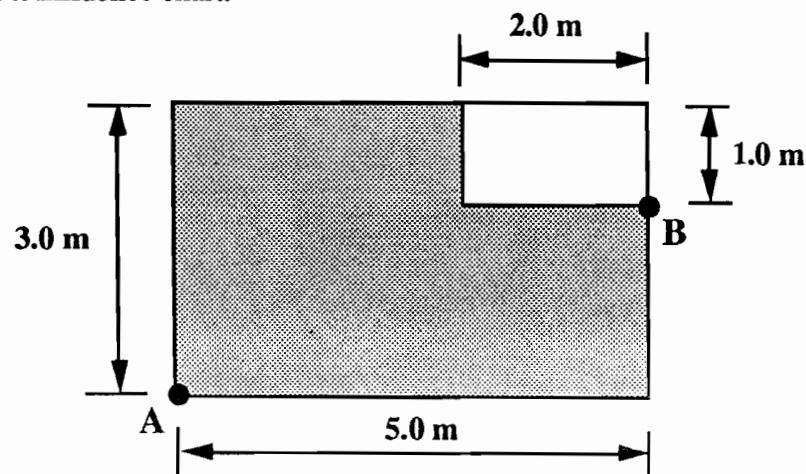
QUESTION 2

A foundation (2.5 m x 2.5 m) is constructed at a depth of 1 m below the ground surface on a medium stiff clay having a shear strength of 70 kN/m^2 , a plasticity index of 35, and an overconsolidation ratio of 2. The clay extends to a depth of 5 m below the footing. The ground water table coincides with the ground surface. The net load per unit area at the level of the foundation is 140 kN/m^2 . Compute the immediate settlement of the foundation.

QUESTION 3

The plan of a footing is shown in the figure. The uniformly distributed load on the footing is 250 kN/m^2 . Calculate the vertical stress increase at a depth of 5 m below points **A** and **B** using:

- (i) Boussinesq solution (m-n chart).
- (ii) Newmark influence chart.



QUESTION 4

Determine the total consolidation settlement in the clay layers shown in the figure below due to the imposed load under point A of the proposed building. The properties of the clay layers were obtained from the two samples as follows:

	Sample #1	Sample #2
e_o	1.01	0.96
c_c	0.30	0.28
c_s	0.06	0.05
p_c (kN/m ²)	125	270

