MSC IN ANALYSIS AND DESIGN OF EARTHQUAKE RESISTANT STRUCTURES (ADERS)

Course: **Geotechnical Engineering in the Design of Structures**

1. Plot the following oedometer test data as e against ln σ_v' and calculate indices c_c and c_s

e	σ_v'
1,2	1,5
1,177	27,5
1,153	56
1,121	202,2
1,1	344,5
1,103	210,3
1,095	337,7
0,879	888,3
0,722	1605,9
0,8	100

2. Table 1 gives data from an oedometer test on a clay sample of initial height H_0=18mm. The initial reading of the dial gauge was 0mm. The data refers to a load increment from 150 to 300kPa. Plot a graph of $\sqrt{t}$ against settlement, and determine the values of c_v (m^2/year) and D (kN/m^2) for the soil.

time (min)	dial gauge reading ($mm*10^{-2}$)
0	159
0.25	173
1	184
2.25	196
4	207
6.25	218
9	227
12.25	235
16	240
25	248
36	254
64	259
100	260
1440	260

3. Show that the average degree of consolidation U relates to settlement through the following expression, where δ(t) is the current value of settlement and δ(f) the final value.

$$\frac{\delta_{(t)}}{\delta_{(f)}} = \frac{1}{H}\int_0^H U_z\,dz = U$$