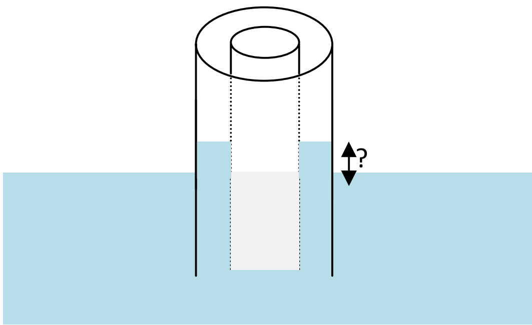
1− Suppose a coaxial cable filled with air (i.e. vacuum) and with inner & outer conductor radii “r1” & “r2” respectively. If we put it into a liquid and an electrostatic potential differential “V” is applied to it, find how much that liquid will be raised :



2− Find the “force per length” between two parallel conductor wires with distance “d”, equal radii “r” (r<<d), and electrostatic potential differential “V”.

3− Find the capacitance between two sphere with distance “d”, and equal radii “R”. (Use “method of images”)

4− (a) Say what boundary condition is between the electric fields (“E”) in the surface between two regions.

(b) Answer the previous question for “D”. (Note that these are true in stationary, quasi−stationary and non−stationary conditions)

(c) Answer that for “J” in a stationary (no time−variation) condition.

5– (a) We have a region filled with a "linear" and "isotropic" but maybe "non–homogeneous" matter described by "ε" and "σ". For a <u>stationary</u> situation, say a general condition that the "Laplace equation" for electrostatic potential is held. (Note that "perfect conductor" is included in it.)

(b) In addition to "Laplace equation", if we want to have zero "<u>free</u> charge density", answer previous question.

6– We have two separate perfect conductors in a region described with <u>constant</u> scalars "ε" and "σ". Show the below relation between the "capacitance" and "resistance" felt between conductors:

$$R.C = \varepsilon/\sigma$$