

Supervision 19
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Read the following sections of the handouts:

Part 4-7 (to slide P176)

Problem Sheet – Q12-18

Q13: You don't have to solve the values of Q and C'. Instead, just derive the following equation.

$$Q = \left(\frac{\epsilon_0 \pi r^2}{d} + C' \right) V$$

Additional Problem

Q15:

If you have time, calculate the electric field of a dipole at any position \vec{R} . The positive charge q of the dipole is at \vec{r} and the negative charge -q is at $-\vec{r}$. This distance of this position is much longer than the distance between the two charges of the dipole, $|\vec{R}| \gg |\vec{r}|$.

Then, based on the results above, derive the electric field of the dipole at (d, 0, 0) and (0, 0, d) as asked in Q15. You should be able to reproduce the same results.