# Quiz 2

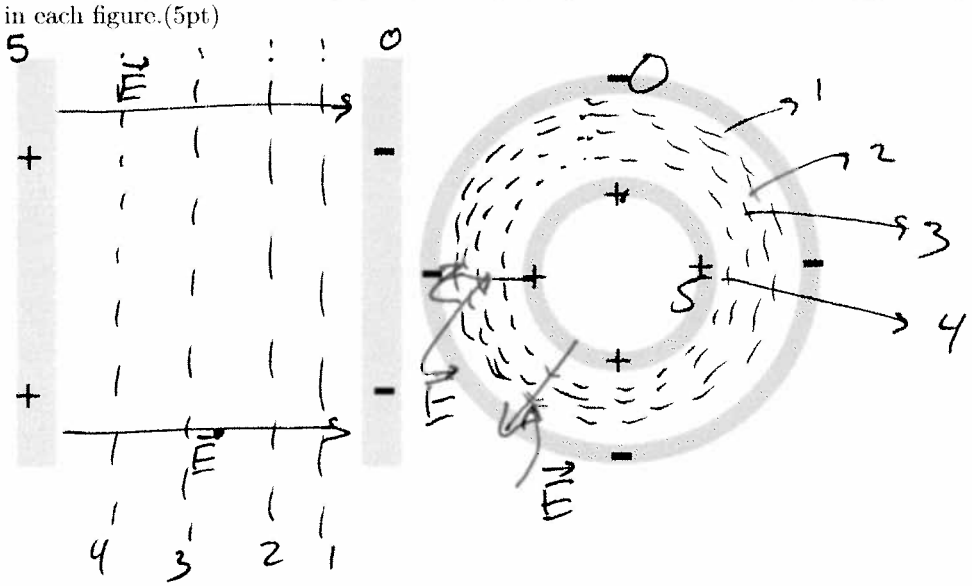
Phys 296: Summer, 2015

1. In a uniform electric field between two parallel plates, a potential probe records the electric potential changing from 2.0 to 2.8 V when it moves 1.0 cm along the direction perpendicular to the plates. Calculate the electric field between the plates.(5pt)

$V_f = 2.8$ $\quad V_i = 2.0$ $\quad 2.8 - 2.0 = 0.8\ V$

$\Delta V = 0.8V$ $\quad \vec{E} = \frac{\Delta V}{\Delta d}\hat{d}$ $\quad \frac{0.8}{1cm} = 0.8V/cm$

2. In Figures 1a and 1b, the electric potential difference between the electrodes is 5.0 V. Draw four equipotential lines with 1 V-difference between two neighboring lines and label each line with the corresponding voltage. Also draw two electric field lines in each figure.(5pt)




3. If the Capacitance of the above device is 10uF. What is the Energy stored in the field. (5pt)

$Q = CV$ $\quad E = \frac{1}{2}CV^2$ $\quad \frac{1}{2}(10\mu F)(5)^2 = 1.25 \times 10^{-4}\ J$

$0.125\ mJ$

4. We know that $\vec{F} = \frac{kq_1q_2}{r^2}\hat{r}$ and $\vec{F} = q\vec{E} + q\vec{v} \times \vec{B}$. Derive the electric field from two point charges, each of charge q. (5pt)

$B = 0$ so $\vec{F} = q\vec{E} = \frac{kq_1q_2}{r^2}\hat{r}$

so $\vec{E} = \frac{kq}{r^2}\hat{r}$