**Lab Report**

**Equipotentials and Electric Fields**

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(a) At any of the eight marked spots around a positive point charge 
q, a positive test charge would experience a repulsive force directed radially outward. (b) The electric field lines are directed radially outward from a positive point charge 
q.

**I Abstract**

Using a conductive ink pen and applying it to electrode figurations on carbon paper, the electric field produced by the power supply electrodes focused onto the paper can be drawn in two dimensions as lines. The electrodes produce equipotential 3d surfaces,who’s shape can change depending on the electrode configuration.

**II Introduction / Purpose**

The location of equipotential surfaces produced near oppositely charged conducting pens can be investigated by constructing the electric field lines perpendicular to the equipotential. Given the configurations for electrodes (opposite line charge, parallel plate capacitor) on the carbon paper, a comparison can be made between the respective experimentally determined electric field lines.

**III Experimental Method and Data**

**III.1 Method**

We applied 20V from the power supply to the electrode configurations mapped on the conductive paper using pins that connect the direct current supply to the paper. Using a voltmeter with two conductive pens, connecting one lead to electrode point on the configuration and the second lead in the area outside of the configuration, we are able to measure the potentials at various locations on the paper.

For the first electrode configuration, two lines of opposite charge, the potentials we searched for on the paper were 3 Volts, 4 Volts, 5 Volts, 6 Volts, and 8 Volts. For the second electrode configuration, parallel plate capacitor, we searched for potentials 1 Volt, 2 Volts, 4 Volts, 6 Volts, and 7 Volts. When a potential was found the coordinates were drawn on a 12X16 cm grid and a continuous line was drawn between points of similar potentials to represent the continuous electric field lines that are everywhere perpendicular to the equipotential surfaces.

**II.2 Raw Data**

Table 1 and 2 lists the data points for the locations of potentials for each electrode configuration. Graph 1 and 2, along with the lab experiment photos, show the drawing for the data points best-fit electric field lines.

**IV Discussion/Data Analysis**

Graph 1 and 2 accurately show the electric field lines for a parallel plate capacitor and two lines of opposite charge. The second graph may not as accurate as the first due to the group not recording enough data points. The best fit line for the data points in graphs 1 and 2 was a polynomial equation with an order of 2.