NYB

Equipotentials and Lines of Forces

Objective:

To map the ***equipotential lines*** of a pair of charges on an electric board, and to draw the ***electric field lines*** (*also called* ***lines of forces***).

Equipment:

Electric potential mapping set (mounting board, conducting paper, special graph paper) battery, connecting wires, voltmeter.

Basic Cocepts:

-An electric field line is the path along which an electric charge would move if it were free to do so.

-An equipotential line is a line on which all points have the same value of electric potential. Since these points have no potential difference between them, charges would not move from one point to the other. But, they would move between two points with different potential; Ex. a positive charge would move from the higher to the lower potential and a negative charge would move in opposite direction.

- A configuration of charges(+ and -) creates in the surrounding space a peculiar electric field . We use the electric field lines to visualize this field.
The electric field lines are always perpendicular to equipotential lines (or sufaces). They get out of "+" charges and get into "-" charges.
Also, they are directed ***from the higher versus*** the ***lower values*** of potential.

Procedure:

1. Connect a 6-V battery to the two posts on the mapping board, as shown.

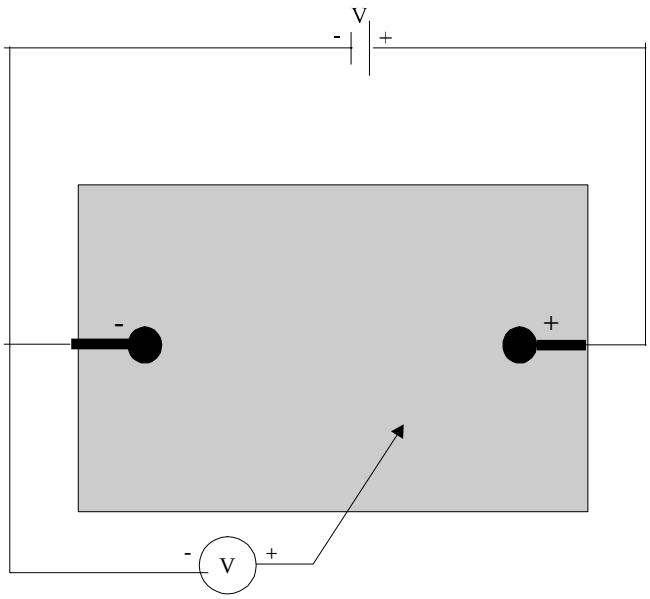
2. Connect the negative terminal of a voltmeter to the negative post on the mounting board (negative side of battery).

3. Connect one end of a wire to the positive terminal of the voltmeter and use the other end of the wire to measure the electric potential point on the mapping board.

4. Move the free end of the wire on the board to find a few points (5-7) with the same electric potential, say 0.5 V. Draw a smooth line with these points.
This is the equipotential line at 0.5 V.

5. Move to some other spot that shows another voltage (e.g.1volt). Repeat the same procedure and take readings to determine another equipotential line.

6. Continue to increase the potential by 0.5 V intervals to map the whole board. You have to determine enough equipotential lines (at least 5). Then, you have to draw a set of electric field lines (lines of force)



Analysis:

From the set of equipotential lines sketch the system of electric field lines. Comment on the distribution of these lines; are they straight or curved? Compare your experimental findings with theoretical predictions.