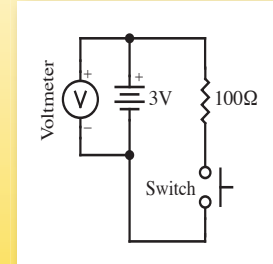
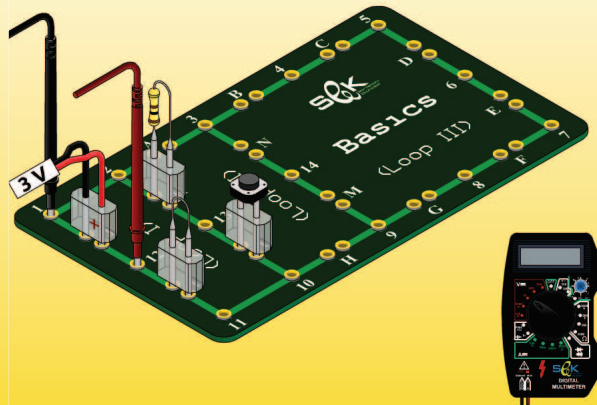


Experiment No. (15) Measuring of Electrical Potential Energy & Internal Resistance of a Battery



Objectives:

1. The student will differentiate between electrical potential energy and voltage.
2. The student will measure the internal resistance of a battery.

Apparatus:

- Basics Board
- Connection wire
- DMM
- Jumper
- Voltage Source (PSB board)
- Resistor 100Ω
- Switch

Procedure and Conclusions:

1. Build a simple circuit by inserting a resistor 100Ω at the pair (K), a switch at the pair (L) and a jumper at the pair (I).
2. Connect (3 volt) from PSB board to the pair (J) using a connection wire.
3. Turn the selection dial of the DMM to DCV mode (range 20 V), insert the DMM probes at the points (1) and (12) to measure the voltage across the batteries terminals.
 - The voltage you measured across the batteries terminals is volt, this is the electrical potential energy (E) of the batteries.
4. Press the switch button to close the circuit and see the change in the Voltmeter reading.

- When the circuit is closed, the voltage across the batteries terminals (V) becomes volt.
5. Remove the DMM probes from the points (1) and (12), set the DMM to the DCA mode (range 200mA), and insert the DMM probes at the pair (I) instead of the jumper.
 6. Press the switch button to close the circuit and see the Ammeter reading which gives the current (I) passes through the circuit.
 - The current passes through the circuit is mA.
 - Calculate the internal resistance of the batteries (2 batteries in series) using the formula [$R_{int} = (E - V) / I$] =
 Ω .

Notes:



- Batteries have a resistance known as internal resistance, to calculate the internal resistance of a battery we use the formula:
 $R_{int} = (E - V) / I$, where E is the electrical potential energy, V is the voltage and I is the current.



Discussion

1. Discuss the difference between electrical potential energy and voltage?