

Investigating EMF and Internal resistance

Aims:

The aim of the practical is to calculate the internal resistance along with the EMF along with their correlation.

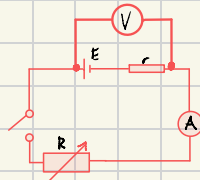
Variables:

Independent = Resistance, $R(\Omega)$

Dependent = Voltage (V), voltmeter; current I(A), ammeter

Control = EMF, internal resistance

Log out:



Apparatus	Purpose
1.5 V Cell	To provide an e.m.f. to the circuit
Resistor	Unknown resistance - to act as internal resistance
100Ω Variable Resistor	To change the values of current and voltage in the circuit
Voltmeter	0-2 V range - to measure voltage
Ammeter	0-200 mA range - to measure current
Wires	At least 6 leads - to make electrical connections
Switch	To open between readings to not run down the battery

Method

- 1) set up apparatus as shown in diagram
- 2) with switch open record V
- 3) set resistor to max value, close switch and record V and A - open switch between readings
- 4) vary the resistance and repeat experiment

reading 1	reading 2	reading 3	mean
V	V	V	V
1.54	1.56	1.57	1.57
1.56	1.57	1.57	1.67
1.54	1.58	1.58	1.58
1.510	1.58	1.58	1.58
1.5	1.59	1.59	1.59

3 sig figs

\downarrow
 $g = -1.1$

$$E = I(R + r)$$

$$E = V + Ir$$

$$V = -rI + E \rightarrow y = mx + c$$

gradient = -r

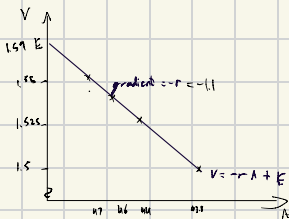
$$EMF = (1.1 \times 0.0027) + 1.54 = 1.59$$

$$\% \text{ uncertainty} = \frac{\text{absolute value}}{\text{value}} \times 100$$

$$\text{accuracy EMF} = \text{Calculated multiple readings} = \frac{\frac{1}{2} \text{ range}}{\text{mean}} \times 100 = 1.59$$

$$\frac{1.59}{1.5} = 1.06$$

so 6% of which is within the accepted range



next time I do this experiment I will do it with equipment that

is more precise and a power bank instead of a battery so I can have

same EMF for repeated results and so others can do it and get

same results.

during the experiment I used a fresh battery

this is so it doesn't run out of power during the experiment. additionally,

I will be able to test my results with the Voltage shown on the battery, etc.