

Lab 03

Thursday, October 11, 2018 10:40 AM

Part I: measure a 1, 1k, and 1M Ω resistor.

Precautions to consider

- ① Measurement lead resistance
- ② Human body resistance

Voltage Divider

- ① Measure battery voltage exactly
- ② Construct voltage dividers A, B



Part II Humidity sensor

- ① 4.5V to V_{cc} through divider
- ② Convert $V_{out} \rightarrow \%RH$ using calibration curve.

Part III Places to consider measurements

- ① House
- ② Parking Garage
- ③ Pool

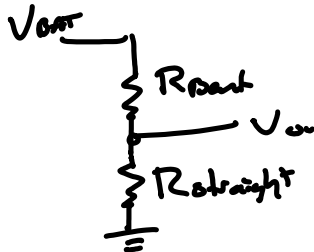
STEP 1 develop a hypothesis

hypothesis - "a position based on initial/limited evidence.
as a starting point for further investigation"

11 OCT 2018 (in lab)

1 M Ω	Bent	0.989 M Ω
1 M Ω	Straight	1.020 M Ω
1 k Ω	Bent	0.985 k Ω
1 k Ω	Straight	0.989 k Ω

V_{BAT} open 8.87 V

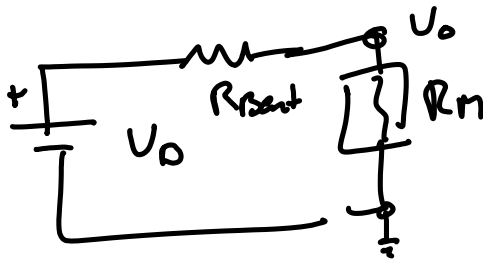


1 k Ω \rightarrow 4.42 V

1 M Ω \rightarrow 4.29 V

$R_{\text{Michael}} = 70 \text{ k}\Omega$

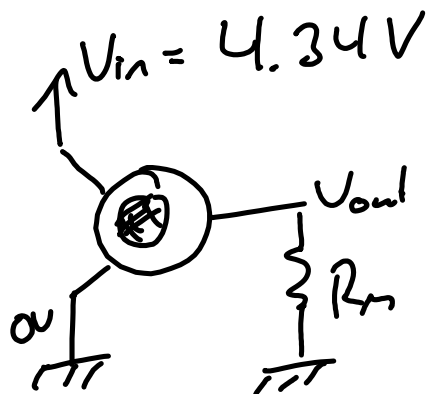
$R_{\text{wires}} = 0.5 \Omega$ total



1 M Ω Bent $\rightarrow V_0 = 8.07 \text{ V}$

1 k Ω Bent $\rightarrow V_0 = 8.86 \text{ V}$

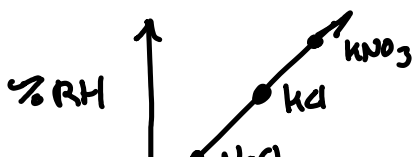
- ① Explain body error in large resistors
- ② Explain lead error in small resistors



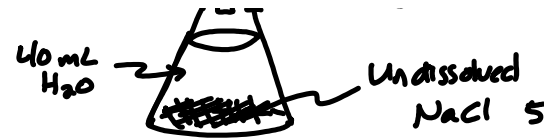
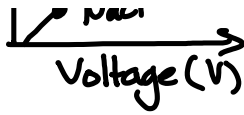
1.66 V @ Ambient

2.75 V @ Breath

Breath
Te



humidity sensor



Required Questions/Analysis

- ① Present data clearly (Tables? Graphs?)
- ② IF doing curve fits for data, is there a theoretical basis for a particular curve fit. (ex. linear)
- ③ Analyzing data → expected trends
- ④ Observations and discrepancies of data
 - Reasons results are different than expected
 - Try to quantify the effects of these discrepancies.
- ⑤ Possible improvements
 - Test setup
 - Procedure
- ⑥ Other applications (of measurement system?)