Two parts

1. Construction of voltage dividers
   1. Measure the resistance of two resistors of two different resistance values
      1. Quantify the effect of technition body resistance
      2. Quantify the effect of lead resistance
   2. Construct a voltage divider and measure the voltage at the output.
      1. Quantify the case of infinit multimter resistance
      2. Quantify the effect of 10 Mohm multimeter resistance
2. Design and execute expirermenet involving mobile humidity sensor
   1. Where is humidity measurement important
   2. How are humidity sensors calibrated
   3. How do saturated salt solutions work
3. Describe the general procedure for hooking up transducers

Key words to use

* Volt
* Ohm
* mA
* Input Impedane
* Loading Error
* Humidity
* Relative Humidity
* Voltage Divider
* Thermistor
* Temperature Compensation
* Case Ground

**Introduction**

Transducers encountered in engineering function by taking a voltage input, and converting it to a voltage output proportion to the engineering measurement. In order to produce accurate measurements, it is critical that the engineer is able to understand and implement precision voltage measurement techniques.

**Materials and Methods**

The resistance of two, 1kohm resistors and two, 1 Mohm resistors was measured using a multimeter in resistance mode (MASTECH). In order to test the effects of the test technitians body resistance when holding on to the multimeter leads, the resistance of the technitian was measured directly. Further, in order to measure the lead resistance, the leads were shorted together, and a measurement was taken.

A voltage divider circuit was constructed first using 1 kOhm resistors, and then again using 1 MOhm resistors. The voltage output was again measured using the voltage setting of a multimeter (MASTECH) and the voltage divider was supplied by a 9 V battery. The open circuit voltage of the battery was later measured by the same multimeter.

A mobile humidity sensor rig was constructed by powering a Honeywell HIH-04602 relative humidity sensor with the 1kohm version of the voltage divider constructed above. The output of the sensor was read using a multimeter in voltage mode.

The humidity sensor was calibrated using a series of saturated salt solutions (KCl, NaCl, and MgSO4). A 50 mL Erlenmyer flask was charged with 50 g of the selected salt, and then filled to the 40 mL mark with boiling hot distilled water. The solutions did not dissolve all of the salt in the flask and remainined statured. The flask was placed in a water bath to control the temperature. The temperature was varied before reading the relative humidity in the flask. The humidity sensor was allowed to settle for at least a minute before each measurement.

**Results and Discussion**

Suggestions

1. Draw the circuit diagram and analysis for the resistance measurements and voltage divider
2. Explain how you constructed your mobile humidity sensor. Include a circuit diagram.
3. Present the results of your expirment.

**References**

https://www.omega.com/temperature/z/pdf/z103.pdf