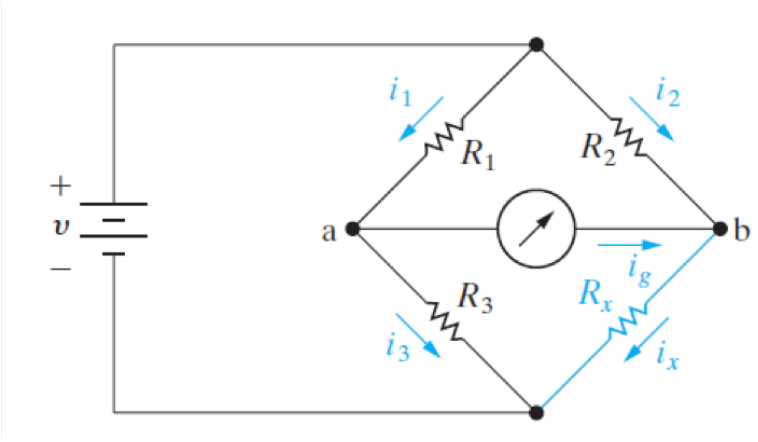
Question 1 [6]

Consider the Wheatstone bridge circuit below with known resistors R_1 and R_2. When measuring the unknonw resistance R_x, one adjusts the adjustable resistor R_3, such that the bridge becomes balanced. When the bridge is balance the current $i_g = 0$. Using the above



information, apply the KCL and KVL to the bridge circuit to derive the equation:

$$R_x = \frac{R_2}{R_1} R_3.$$

Question 2 [2]

Consider a circuit with a power source and a resistor. If you want to measure the current flowing through the resistor how should you connect the ammeter and ideally what would its own resistance be?

Question 3 [2]

Consider a circuit with a power source and a resistor. If you want to measure the voltage across the resistor how should you connect the voltmeter and ideally what would its own resistance be?