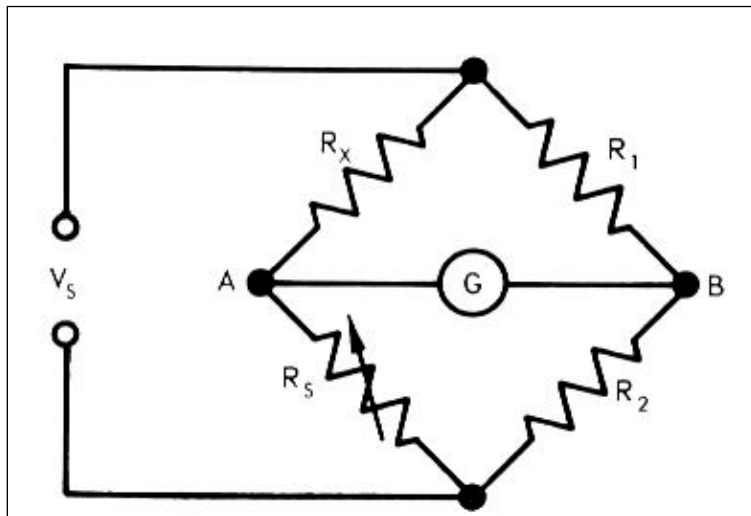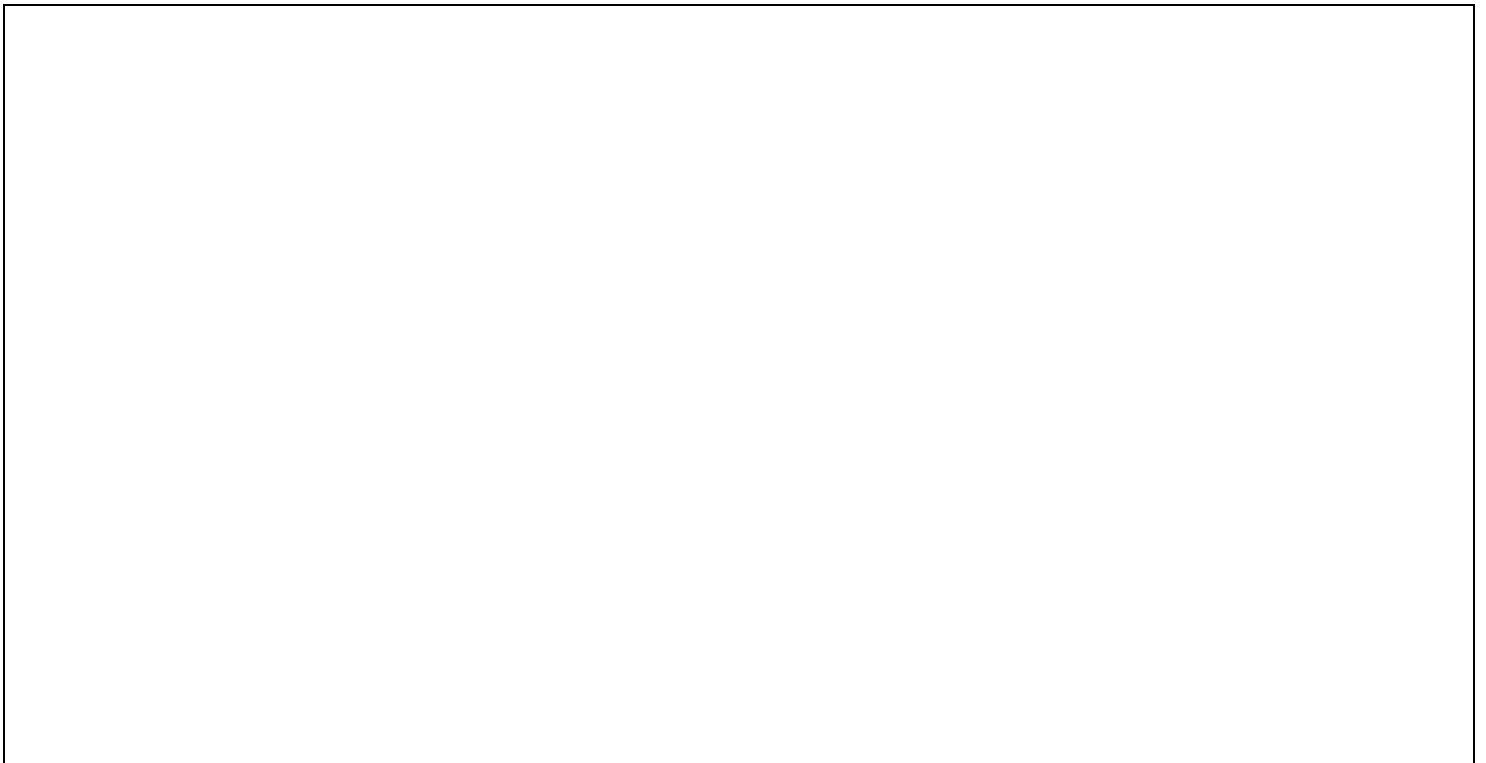EET 130
The Wheatstone Bridge and Strain Gauges

Objectives
- Analyze series-parallel DC circuits
- Build and take measurements in series-parallel DC Circuits
- Use innovative and critical thinking to analyze a problem.

Recall from series-parallel circuits: the Wheatstone Bridge

How can we redraw the circuit to facilitate analysis?

Using your redrawn circuit and the following values, compute the voltage between points A and B.

V_S=12V

R_1= 220Ω
R_2=100Ω
R_x= 3.3kΩ
R_s=2.2kΩ

V_{AB}= _____

Is this bridge balanced? _____

Notice the symbol for R_S. Recall that this symbol means a variable resistor, such as a potentiometer. By adjusting the value of R_S, we can "balance" the bridge.

How do we determine the value of R_S that will balance the bridge?

Application

One application for the Wheatstone Bridge is a *strain gauge circuit*, used for p*recision weighing or structural monitoring*. In the typical strain gauge circuit, a *foil strain gauge* takes the place of one of the resistors. The *resistance of the foil strain gauge changes as is it stretched or compressed.* If we know the strain gauge characteristics, we can determine the amount of stretch or compression of the material or structure we're measuring. We will discuss foil strain gauges and a new type of elastomer strain gauge in class.