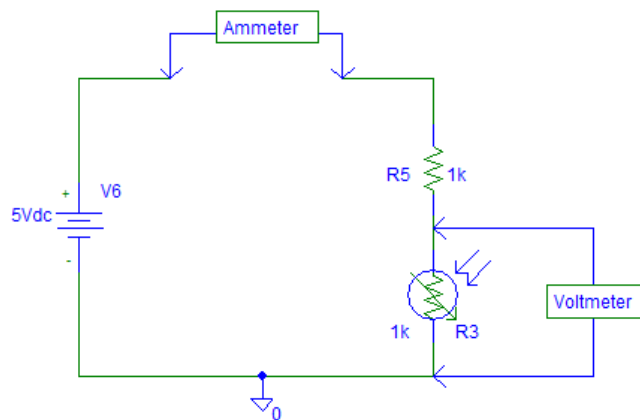


**ST 589-01 Lab 4****Photoresistor's light response**

The cadmium-sulfide (CdS) is a robust and simple circuit element that obeys Ohm's law; its resistance decreases when photons create carriers in the substrate. The photoresistor is less sensitive to the photodiode and the phototransistor, but simpler to use. The photoresistor is made of high resistance semiconductor. If light falling on the device is of high enough frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electron (and its hole partner) conduct electricity, thereby lowering the resistance. A CdS photoresistor may have a resistance of 10 k $\Omega$  when exposed to light (light resistance) and  $\sim 1$  M $\Omega$  when covered (dark resistance), and a response time of 10-60 msec.

In this lab we are going to use a multimeter to measure the response of a photoresistor to visible light (0.4 – 0.7  $\mu\text{m}$ ). A 5 Vdc power supply will provide voltage to a resistor and a photoresistor in series, as shown in Figure 1. Measure the current and voltage across the photoresistor when this is exposed to ambient light (good light conditions), and when this is covered (poor light conditions). We can assume a linear response with increasing light intensity.



**Figure 1.** A simple photoresistor circuit

**Questions to answer before the experiment**

What voltage and current values do you expect to measure when the photoresistor is exposed to visible light?

What voltage and current values do you expect to measure when the photoresistor is covered?