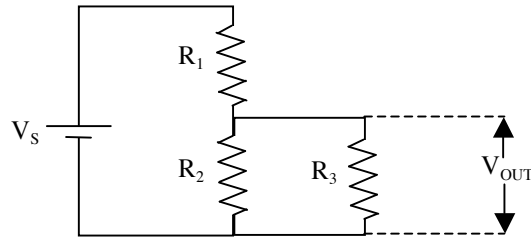


PHY2250 HW3

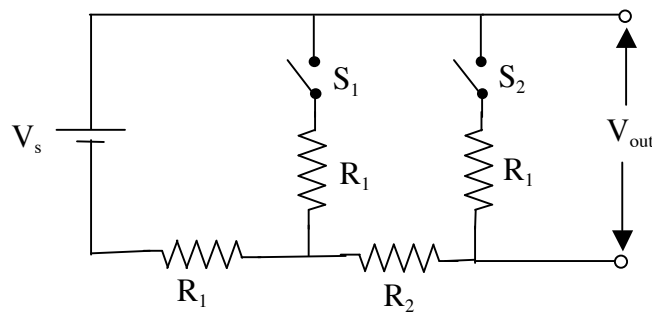
Answer on separate paper.

Do all problems. Show all work

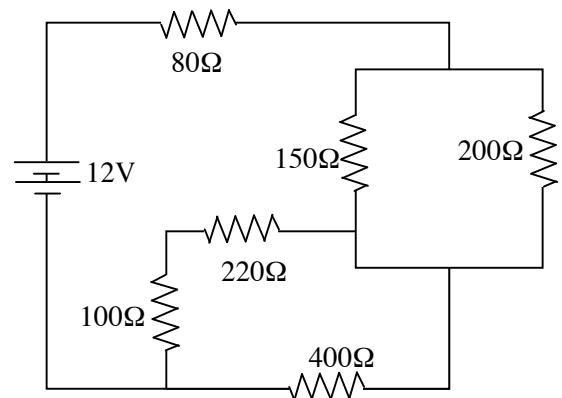
1. Find a formula for a *loaded* voltage divider, i.e. find V_{OUT} as a function of V_S , R_1 , R_2 , and R_3 :



2. Shown below is a circuit for providing a variety of output voltages using two switches, labeled S_1 , S_2 . Find the output voltage for all possible combinations of switch settings. Let $V_S=120V$, $R_1=100\Omega$ and $R_2=200\Omega$.



3. Given the schematic shown, calculate...
- The total power dissipated
 - the voltage across the 100Ω resistor
 - The current through the 400Ω resistor



4. In Greg's new studio, he runs a cable from his expensive, vintage mic preamp from the control room into the tracking room. The open-circuit voltage across the cable is $48V$, but he finds that when he plugs it into the mic, he only gets $41V$ across the mic. He decides to turn up the voltage on the mic pre in order to compensate for the internal resistance of the preamp and the resistance of the cable. What output voltage should he set the preamp to in order to get "exactly" $48V$ across the mic?