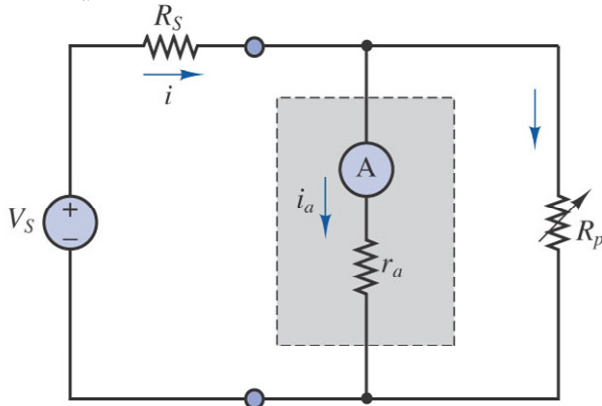


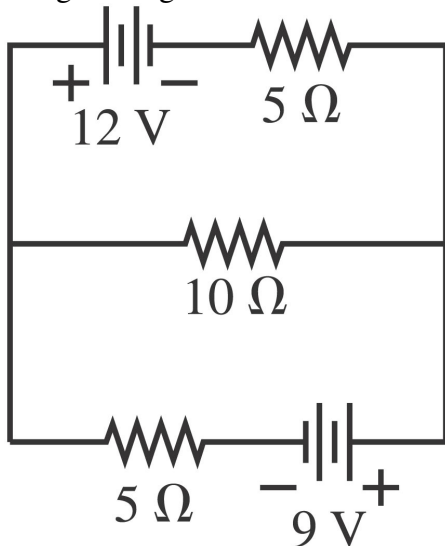
Problem 1

A circuit that measures the internal resistance of a practical ammeter is shown in the figure below, where $R_s = 50,000\Omega$, $V_s = 12\text{V}$, and R_p is a variable resistor that can be adjusted as will.

- Assume that $r_a \ll 50,000\Omega$. Estimate the current i .
- If the meter displays a current of $150\text{ }\mu\text{A}$ when $R_p = 15\Omega$, find the internal resistance of the meter r_a .

**Problem 2**

What is the current through the $10\text{ }\Omega$ resistor in the Figure below? Is the current from left to right or right to left?



Problem 3

Is there a battery for which the $200\ \Omega$ resistor in the figure below dissipates no power? If so, what are its emf and its orientation? That is, is the negative terminal on the top or bottom?

