

Consider a battery in an automobile. When connected to the radio (with everything else switched off), the battery provides 12.75 V to the radio. When connected to the headlights (with everything else off), the battery provides 11.75 V to the lights.

Assuming that the radio can be modeled as a 5- $\Omega$  resistor and the headlights as a 0.75- $\Omega$  resistor, determine the Thevenin equivalent circuit model for the battery.

$$V_{Th} = \underline{\hspace{2cm}} \quad R_{Th} = \underline{\hspace{2cm}}$$

What voltage would the battery provide if the radio and headlights are turned simultaneously? (This is a parallel connection.)

$$V_L = \underline{\hspace{2cm}}$$

If the starter can be modeled as a 0.05- $\Omega$  resistor, what current flows when the starter is engaged? (Assume that everything else is disconnected when the starter is engaged.)

$$I_{start} = \underline{\hspace{2cm}}$$