



a.) Find the internal resistance of the battery.

b.) Find the terminal voltage.



c.) If a second resistor is added as shown, what happens to the terminal voltage of the battery?
i) increase ii) decrease iii) same

d.) Explain your reasoning

$$a.) \quad \mathcal{E} = I_T R_T \quad R_T = \frac{\mathcal{E}}{I_T} = \frac{9.0V}{1.8A} = 5.0\Omega$$

$$R_T = R + r \quad r = 1.0\Omega \quad \checkmark$$

$$b.) \quad V_{\text{Term}} = \mathcal{E} - I_T r = 9.0V - (1.8A)(1.0\Omega) \\ = 7.2V \quad \checkmark$$

c.) increase \checkmark

d.) Since R_T increases, I_T decreases \checkmark

less current through battery means less internal voltage drop \checkmark

\therefore greater V_{Term}

$$V_{\text{Term}} = \mathcal{E} - I_T r$$

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