Answer on Question #52321-Physics-Electromagnetism

A battery has emf $\varepsilon = 13.2V$ and internal resistance $r = 24m\Omega$. If the load current is $I = 20.0A$, find the terminal voltage of the battery.

Solution

Let use the Ohm's law for closed circuit with electromotive force:

$$\frac{\varepsilon}{R + r} = I.$$

The terminal voltage of the battery is

$$U = \varepsilon - Ir = 13.2 - 20 \cdot 0.024 = 13.2 - 0.48 = \ 12.72 \, V.$$

Answer: 12.72 V.