

Answer on Question #45989 – Physics – Electromagnetism

Question.

A battery charger supplies 10 A to charge a storage battery which has an open - circuit voltage of 5.6 V. If the voltmeter connected across the charger reads 6.8V, what is the internal resistance of the battery at this time?

Given:

$$I = 10 \text{ A}$$

$$U = 5.6 \text{ V}$$

$$\varepsilon = 6.8 \text{ V}$$

Find:

$$r = ?$$

Solution.

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

$$\frac{\varepsilon}{R + r} = I, \text{ where}$$

ε is the electromotive force;

I is the electric current;

R is the external resistance;

r is the internal resistance.

$$\varepsilon = IR + Ir = U + Ir, \text{ where}$$

U is the voltage in circuit.

So,

$$r = \frac{\varepsilon - U}{I}$$

Calculate:

$$r = \frac{6.8 - 5.6}{10} = \frac{1.2}{10} = 0.12 \text{ Ohm}$$

Answer.

$$r = \frac{\varepsilon - U}{I} = 0.12 \text{ Ohm}$$