Answer on Question #61343-Physics-Electric Circuits

13) 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?

a) 1.3Ω

b) 0.52Ω

c) 0.12Ω

d) 2.1Ω

Solution

Since the battery is charging

$$V = E + Ir,$$

where $I = 10\ A, E = 5.6\ V, V = 6.8\ V$.

The internal resistance of the battery at this time is

$$r = \frac{V - E}{I} = \frac{6.8 - 5.6}{10} = 0.12\ \Omega.$$

14) Battery of e.m.f. $\mathcal{E}$ and negligible internal resistance is connected to two resistors of resistances R_1 and R_2 as shown in the figure. What is the potential difference across the resistor of resistance R_2.

a) E(R1+R2)R1

b) ER2(R1+R2)

c) E(R1+R2)R2

d) ER2R1

Solution

Two resistors of resistances must be connected in series, because from parallel connection we know $U_1 = U_2 = \mathcal{E}$.

According Kirchhoff law:

$$\mathcal{E} - IR_1 - IR_2 = 0 \rightarrow I = \frac{\mathcal{E}}{R_1 + R_2},$$

where I is the current.

The potential difference across the resistor of resistance R_2:

$$U_2 = IR_2 = \frac{\mathcal{E}R_2}{R_1 + R_2}.$$

Answer: $\boldsymbol{\frac{\mathcal{E}R_2}{R_1+R_2}}$**.**