

Answer on Question #45817– Physics – Electric Circuits

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 6.8 V , what is the internal resistance of the battery at this time?

- a) $1.3\ \Omega$;
- b) $0.52\ \Omega$;
- c) $0.12\ \Omega$;
- d) $2.1\ \Omega$.

Solution: when being charged, the terminal voltage supplies both the emf and potential drop in the internal resistance. Therefore,

$$U = \epsilon + Ir,$$

where ϵ is the open-circuit voltage and r is inner resistance. From last equation we get

$$r = \frac{U - \epsilon}{I} = \frac{6.8 - 5.6}{10} = 0.12\ \Omega.$$

Answer:

c) $0.12\ \Omega$.