Answer on Question #45822, Physics, Other

An ammeter is suspected of giving inaccurate readings. In order to confirm the readings, the ammeter is connected to a silver votltameter in series and a steady current is passed for one hour. The ammeter reads 0.56A and 2.0124g of silver is deposited. Which reading is right?

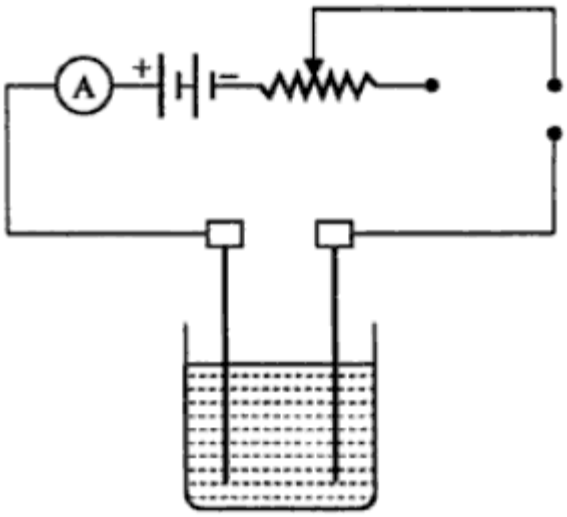
0.06A

0.11A

1.1A

6.0A

Solution:



Electric current is passed for a known time $t = 1\,hour = 3600\,s$. The mass of silver deposited on the cathode is measured.

$$I = \frac{m}{Zt}$$

Z is known as the electrochemical equivalent (E.C.E) of the substance.

For silver $Z = 1.118 \cdot 10^{-6}$ kg/C.

Thus,

$$I = \frac{2.0124 \cdot 10^{-3}}{1.118 \cdot 10^{-6} \cdot 3600} = 0.5 \text{ A}$$

The comparison of this current with the ammeter reading helps us to know the accuracy of the ammeter. Then the error in ammeter reading is +0.06 A.

Answer: **The right reading is 0.5 A. The error is +0.06 A.**