

## Answer on Question 74523, Physics, Electric Circuits

### Question:

A DC ammeter reads a steady current of  $120\text{ mA}$ . How many electrons move in it in 1 minute?

### Solution:

Let's first find how many coulombs of electric charge pass through the DC ammeter in 1 minute from the definition of the current:

$$I = \frac{q}{t},$$

here,  $q$  is the electric charge passing through the ammeter in time  $t$ .

Then, we get:

$$q = It.$$

From the other hand, we can write:

$$q = ne,$$

here,  $n$  is the number of electrons,  $e = 1.6 \cdot 10^{-19}\text{ C}$  is the charge of the electron.

Finally, we can equate these two equations and find the number of electrons moving through the DC ammeter in 1 minute:

$$ne = It,$$

$$n = \frac{It}{e} = \frac{120 \cdot 10^{-3}\text{ A} \cdot 60\text{ s}}{1.6 \cdot 10^{-19}\text{ C}} = 4.5 \cdot 10^{19}\text{ electrons}.$$

### Answer:

$$n = 4.5 \cdot 10^{19}\text{ electrons}.$$

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