task_klegpky1gugolsq7_with_calculation

Student Group

First Name	Surname	Matrikel Nr.

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Exercise E19 Electron flow

How many electrons pass through a control cross-section of a metallic conductor when the current of $40~{\rm mA}$ flows for $4.5~{\rm s}$?

Result

Solution

\begin{align*} 1.1*10^{18}~{\rm electrons} \end{align*}

\begin{align*} Q &= I \cdot t \\ &= 0.04~{\rm A} \cdot 4.5~{\rm s} \\ &= 0.18~{\rm As} \\ &= 0.18~{\rm C} \\ &={0.18~{\rm C}}\cdot {1\over{1.6022*10^{-19}{\rm C/electron}}} = 1.1 \cdot10^{18}~{\rm electrons} \end{align*}