Answer to Question #80509, Physics / Electric Circuits

Question: A TV set shoot out a beam of electrons the beam current is 10 uA how many electrons strike the TV screen in each second how much charge strikes The screen in a minute

Solution:

If the current of the beam of electrons is $I = 10\,\mu A = 10^{-5}\,A$ than the charge transported towards the screen in a period of time t (seconds) can be calculated as

$$q = I * t$$

So the charge that strikes the screen in 1 minute (i.e. 60 seconds) will be

$$q = I * t = 60 * 10^{-5} = 6 * 10^{-4}\,C$$

Consequently the number of electrons transported towards the screen in 1 second, considering that the charge of electron is approximately equal to $q_e \approx 1.60 * 10^{-19}\,C$, will be

$$N = \frac{I * t}{q_e} \approx \frac{10^{-5}}{1.60 * 10^{-19}} \approx 6.25 * 10^{13}$$

Answer:

The number of electrons that strike the TV screen in each second is approximately equal to

$$N \approx 6.25 * 10^{13}$$

The charge that strikes the screen in 1 minute will be

$$q = I * t = 60 * 10^{-5} = 6 * 10^{-4}\,C$$

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