

1. find current when 100 million electrons flow through a cross section of a conductor in one micro second.
2. how much work is done in moving a charge of 5 C from infinity to a 5 A , if potential at A is 20 volt?

Solution

1. We use the formula for current:

$$I = \frac{\Delta q}{\Delta t} = \frac{Ne}{\Delta t} = \frac{100 * 10^6 * 1.6 * 10^{-19}}{10^{-6}} = 1.6 * 10^{-5} A = 16 \mu A$$

where Δq - is charge that passed through a cross section of a conductor, Δt - is time interval, N - the number of electrons, e - is charge of one electron.

2. The work is done in moving a charge A:

$$A = q(V_A - V_\infty) = 5 * (20 - 0) = 100 J$$

where q is a charge, V_A is a potential at the point A, V_∞ is a potential at infinity.

Answer: 1) 16 μA ; 2) 100 J.