

Answer on Question #59029, Physics / Electromagnetism |

The electric potential difference between two points A and B is 42 V. What is the work done by an external agent in carrying a charge of $5.0 \times 10^{-5} \text{C}$ from A to B at constant speed?

$2.1 \times 10^{-3} \text{J}$

$8.4 \times 10^{-4} \text{J}$

$21 \times 10^{-4} \text{J}$

$8.4 \times 10^{-3} \text{J}$

Solution:

By definition, the electric potential difference is the difference in electric potential (V) between the final and the initial location when work is done upon a charge to change its potential energy.

The electric potential difference is

$$\Delta V = \frac{A}{q}$$

Hence,

$$A = \Delta V q$$

$$A = 42 \cdot 5.0 \cdot 10^{-5} = 0.0021 \text{ J} = 2.1 \cdot 10^{-3} \text{ J}$$

Answer: $2.1 \times 10^{-3} \text{J}$