Answer on Question #41112 - Physics - Electric Circuits

Question.

How much energy is given to each coulomb of charge passing through a 6v battery?

$\Delta U = 6\,V$

$Q = 1\,C$

$W = ?$

Solution.

By definition voltage is equal to the work done per unit charge against a static electric field to move the charge between two points. Or it is the difference in electric potential energy of a unit charge transported between two points.

$$\Delta U = \frac{A_{el}}{Q}$$

$A_{el} = W$

So,

$W = \Delta U \cdot Q$

$W = 6 \cdot 1 = 6\,J$

Notation.

If it's a capacitor, it is necessary to use the well-known formula:

$$W = \frac{Q\Delta U}{2}$$

In this case: $W = 3\,J$

Answer.

$W = \Delta U \cdot Q = 6\,J$