Potential Difference

1) How much work is needed to move a 8.6 uC charge from ground point to a point whose potential is 75 V?

$W = (8.6 \times 10^{-6})(75) = 6.45 \times 10^{-4}\ J$

2) How much work is needed to move a proton from a place where its potential is +100 V to a place where it is -50 V?

$W = (1.602 \times 10^{-19})(150) = 2.4 \times 10^{-17}\ J$

3) How much energy is lost as an electron falls through a potential difference of 21000 V in a TV tube?

$PE = (21000)(1.602 \times 10^{-19}) = 3.36 \times 10^{-15}\ J$

4) What amount of energy does a toaster use to make toast if it hass 800 C of charge passing through it with a potential difference of 120 V?

$PE = 800(120) = 96000\ J$

5) What is the potential difference across a refrigerator if 75 C of charge transfers 9000 J of energy to the compressor?

$9000 = 75\ V \qquad V = 120\ V$

6) A flash of lightning transfers 1.5 x 10^9 J of electric energy through a potential difference of 5.0 x 10^7 V between a cloud and the ground. How much charge is transferred by the bolt?

$1.5 \times 10^9 = (5.0 \times 10^7)q \qquad q = 30\ C$

7) If a charge of 0.30 C moves from one point to another in a conductor and , in doing so, releases 5.4J of electric energy, what is the potential difference between the two points?

$5.4 = (.30)V \qquad V = 18\ V$

8) If tow points in a conductor have the same potential, how much work must be done to move an electron from one plate to the other?

NONE

9) What is the potential difference between two points if 1 kJ of work is required to move 1 C of charge between them?

$1000 = 1\ V \qquad V = 1000\ V$

10) What is the energy of an electron accelerated through a potential difference of 1.0 MV?

$PE = (1.602 \times 10^{-19})(1.0 \times 10^6) = 1.6 \times 10^{-13}\ J$

11) What is the potential difference between two points when a charg of 80 C has 400 J of energy supplied to it as it moves between the points?

$400 = 80\ V \qquad V = 5\ V$