**Resistance**

The flow of charge through any material encounters an opposing force (mechanical friction).

This is due to collision between electrons and atoms,

These collisions convert electrical energy into heat.

|  |  |
| --- | --- |
| This opposition is called resistance of the material,  The unit of resistance is the “ohm” **Ω** |  |

**Ohm’s Law, Power and Energy**

**4.1 OHM’S LAW**

Effect ≡ Current

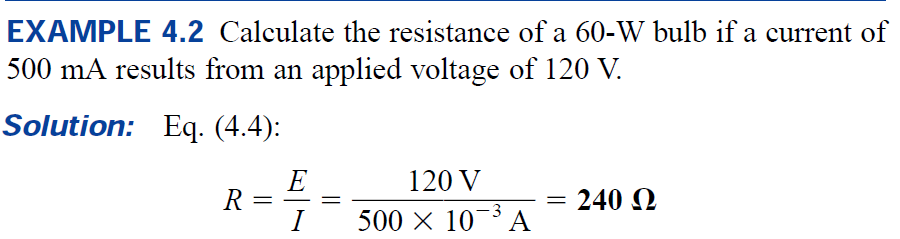
Cause ≡ Potential difference or voltage

Opposition ≡ Resistance

|  |  |
| --- | --- |
| Ohm’ s Law |  |

|  |  |
| --- | --- |
| Defining the polarity:  flow of charge:  from a high **(+)** to a low **(-)** potential |  |

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**4.3 POWER**

Power is an indication of how much work can be accomplished in a certain time

**Power ≡ Rate of doing work**

1 Watt (W) ≡ 1 Joule (J)/second(s) = J/s

|  |  |
| --- | --- |
| unit of power is Watts (W) or (J/s)  1 horsepower (hp) = 746 W |  |

In electrical device the power absorbed or delivered is:

(W)

**In a resistance**

|  |  |
| --- | --- |
|  |  |

For resistive element, all the power delivered is dissipated in the form of heat.

In Voltage supply (battery)

|  |  |
| --- | --- |
| Power is supplied by the source | Power is absorbed by the source |



**4.5 EFFICIENCY**

|  |  |
| --- | --- |
| Energy flow in a system that converts energy from one form to another.  due to losses and storage |  |

The efficiency (η) of the system is:

η is always less than 1 (100 %)