

## **SUBELEMENT T4 – Radio and electronic fundamentals – 5 exam questions – 5 groups**

**T4A – Names of electrical units, DC and AC, what is a radio signal, conductors and insulators, electrical components - 1 exam question**

**T4B – relationship between frequency and wavelength, identification of bands, names of frequency ranges, types of waves – 1 exam question**

**T4C - How radio works: receivers, transmitters, transceivers, amplifiers, power supplies, types of batteries, service life – 1 exam question**

SUBELEMENT T4 – Radio and electronic fundamentals – 5 exam questions – 5 groups (Continued)

**T4D – Ohms law relationships – 1 exam question**

**T4E - Power calculations, units, kilo, mega, milli, micro - 1 exam question**



# Voltage & Current

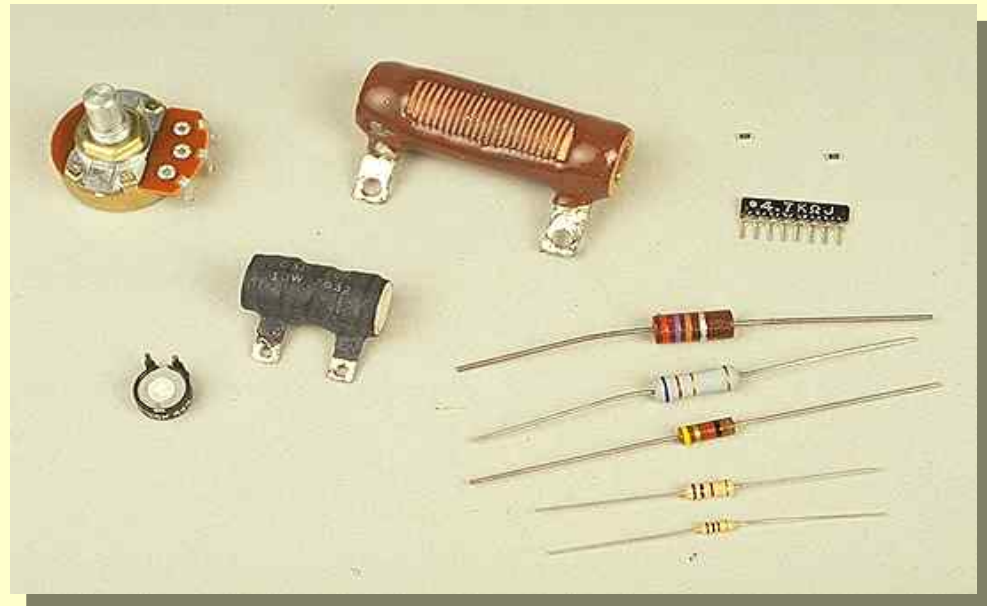
- ◆ Current is the flow of electrons in an electric circuit.
  - Current can be compared to the flow of water in a pipe.
  - The basic unit of current is the ampere.
- ◆ Electromotive Force or Voltage is the force that pushes the electrons thru the circuit.
  - Voltage can be compared to pressure that pushes water thru a pipe.
  - The basic unit of voltage is the volt.

# Power

- ◆ Power is the amount of energy consumed or supplied in or by an electric circuit.
  - The rate at which work is done is electric power.
  - The basic unit of electric power is the Watt.

# Resistance

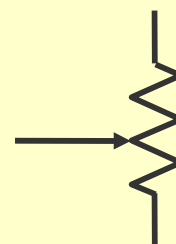
- ◆ Resistance opposes the flow of electrons in a material.
- ◆ Resistance limits the current that can flow thru a circuit.
- ◆ Resistance can be compared to a restriction in a water pipe.
- ◆ The ohm is the basic unit of resistance.



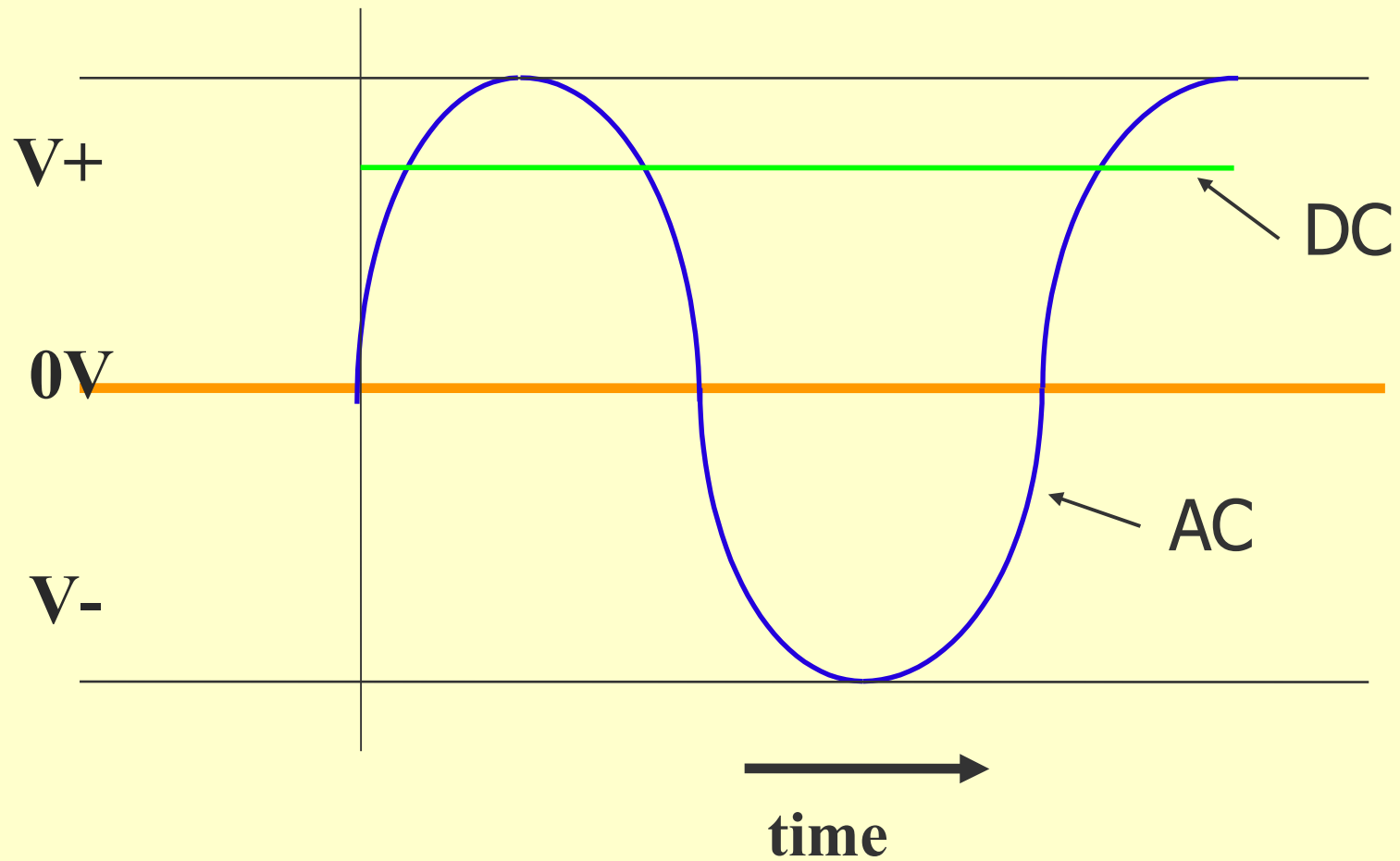
Fixed-value resistor



Variable resistor or potentiometer



# Alternating & Direct Current



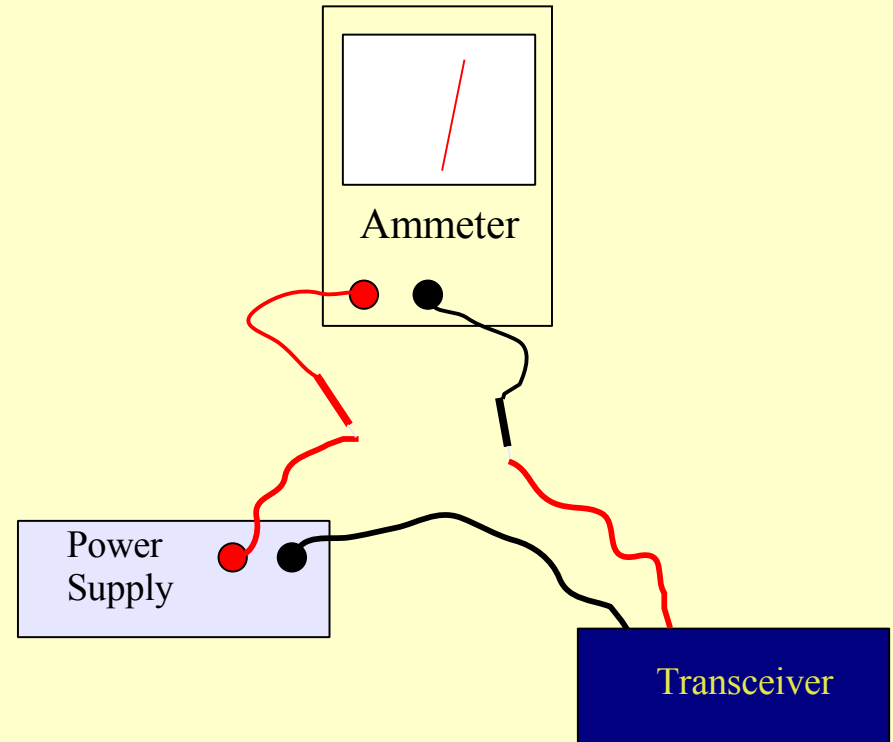
# Conductors

Materials that allow the flow of electrons are called conductors. Some good conductors are:

- Gold
- Silver
- Aluminum
- Copper
- Most metals

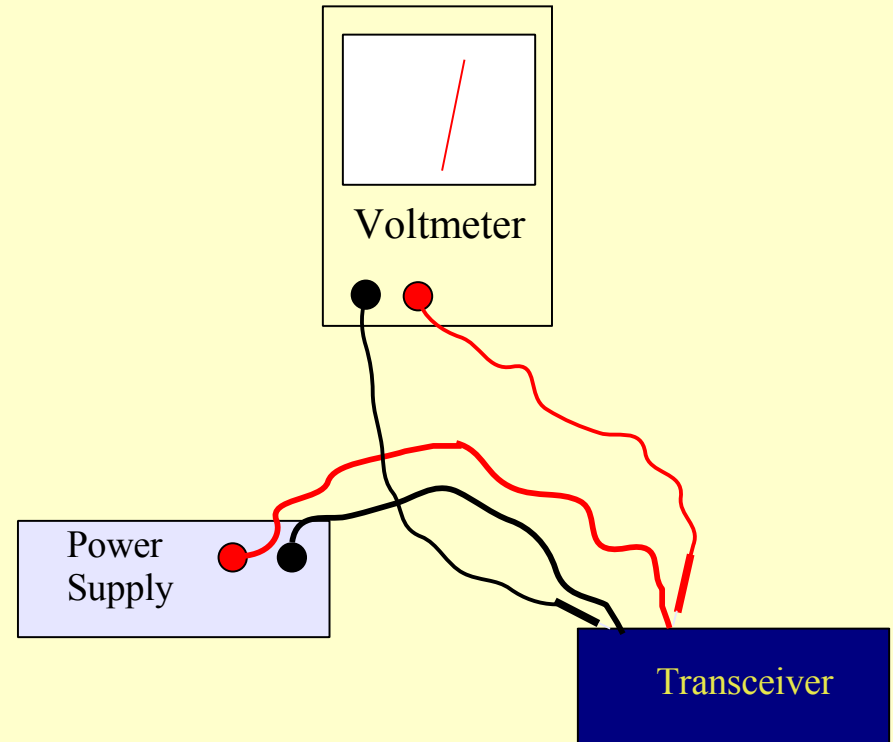
# Ammeter

- An ammeter measures current.
- An ammeter is connected in series with the circuit under test.

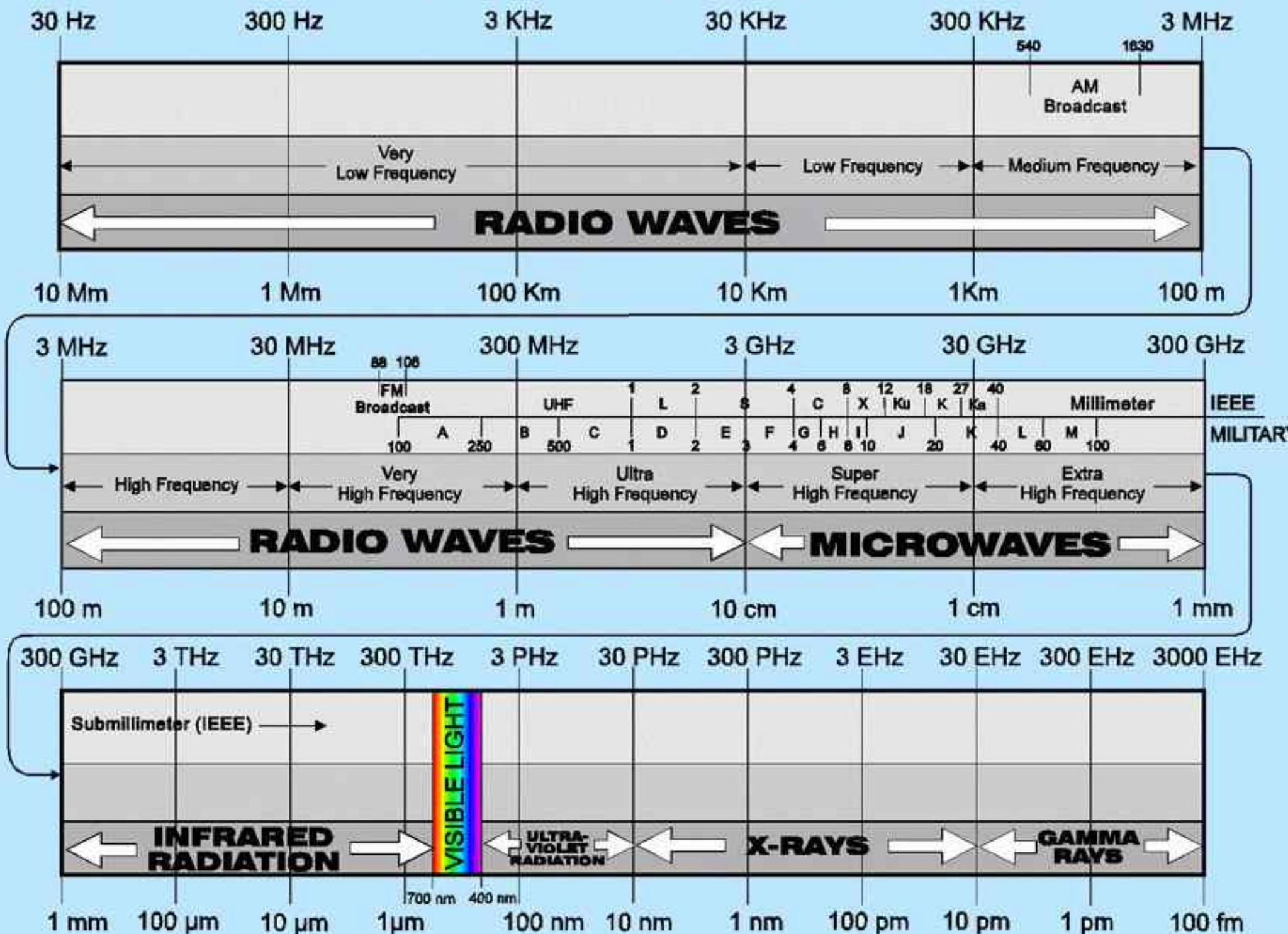


# Voltmeter

- ◆ A voltmeter is used to measure electromotive force.
- ◆ A voltmeter is connected in parallel with the circuit under test.
- ◆ When you switch a voltmeter to a higher range resistance is added in series with the meter.



# RADIO FREQUENCY SPECTRUM



# Wavelength Formula

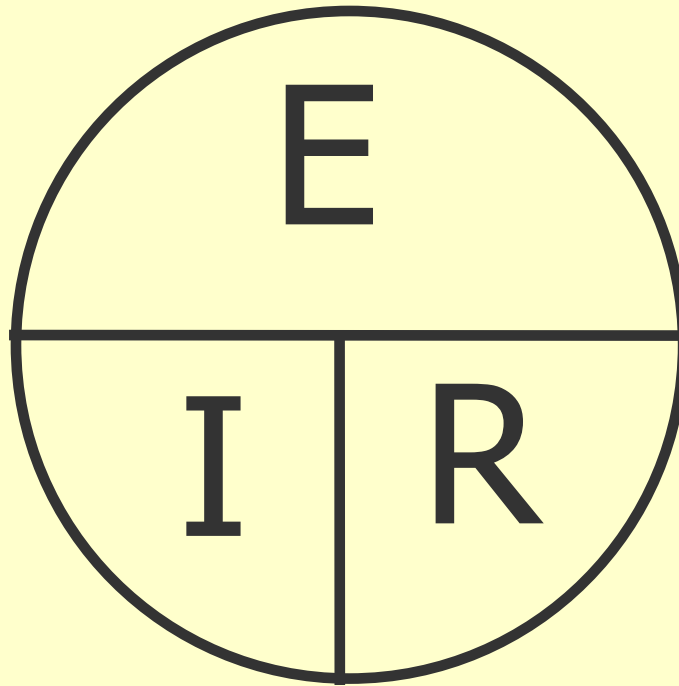
To convert from frequency to wavelength:

$$\text{Wavelength (m)} = \frac{300}{\text{freq (MHz)}}$$

Wavelength and Frequency are Inversely Proportional. As one goes up, the other must go down.

# Ohms Law

Electromotive Force, VOLTS

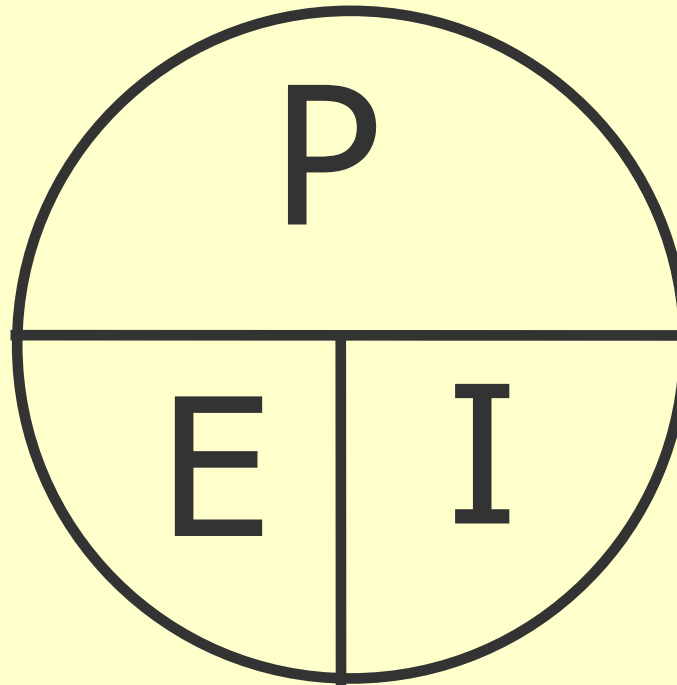


The flow of  
electrons  
AMPERES

Resistance  
to current flow  
OHMS

# Ohms Law

Power, WATT



Electromotive  
Force, VOLTS

The flow of  
electrons  
AMPERES

# Unit Conversion

1 kilohertz = 1000 Hertz

3.525 MHz = 3525 kHz

1,000,000 picofarads = 1 microfarad

500 milliwatts = 0.5 watts

3000 milliamperes = 3 amperes