

SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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23EET101 / BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING I YEAR / I SEMESTER UNIT-I: ELECTRICAL CIRCUITS

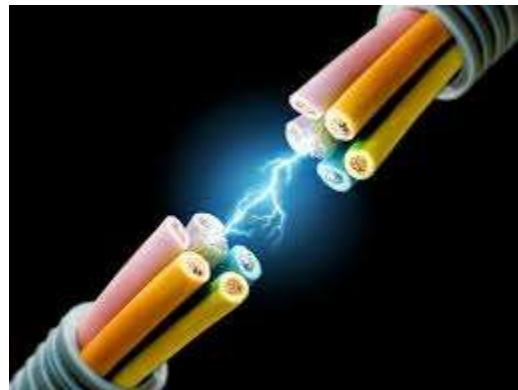
ELEMENTARY CONCEPTS OF ELECTRIC CIRCUITS





TOPIC OUTLINE

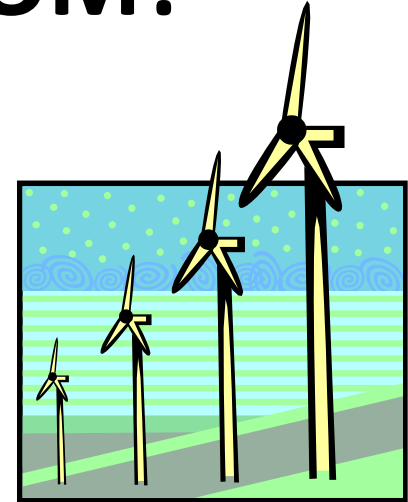
- Electricity?
- Voltage, Current, Resistance
- Nature of Current
 - Ohms Law





ELECTRICITY COME FROM?

- We buy it from **Power Plants**
- We can generate it ourselves
 - **Diesel** or **gasoline** generators
 - Generated in our **Car**
 - Generated by home **Solar** or **wind power**
- We can get it from **Batteries**
- Sometimes we get it when we **don't want** it
 - **Lightning**





VOLTAGE (V)

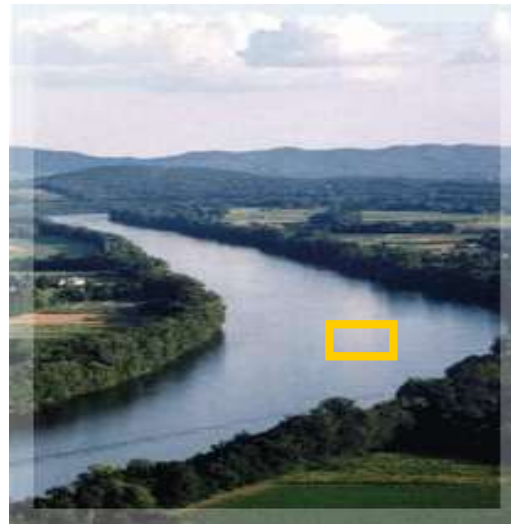
- It is the **push or pressure** behind current flow through a circuit, and is measured in **(V) volts**.
- **Quantitative** expression of the **potential difference** in charge between two points in an electrical field.





CURRENT (I)

- Current refers to the **quantity/volume** of electrical **flow**. Measured in Amps (A)
- **Flow of Electrons**





RESISTANCE (R)

- Resistance to the flow of the current. Measured in Ohms Ω
- It **opposes an Electric Current**





CHART

Quantity	Symbol	Unit of Measurement	Unit Abbreviation
Current	I	Ampere ("Amp")	A
Voltage	E or V	Volt	V
Resistance	R	Ohm	Ω





NATURE OF CURRENT

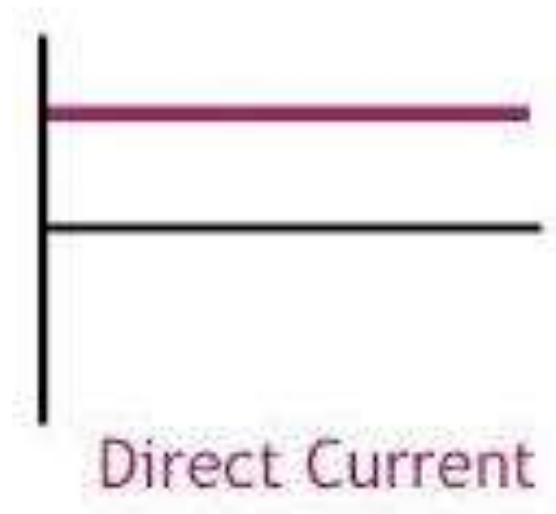
- Most power generated is **Alternating Current (AC)** power where the current and voltage varies **Sinusoidal** with time
- **Direct Current (DC)** power **doesn't vary** with time
- Most **consumer** products **use** both **AC** and **DC**





a. DC CURRENT

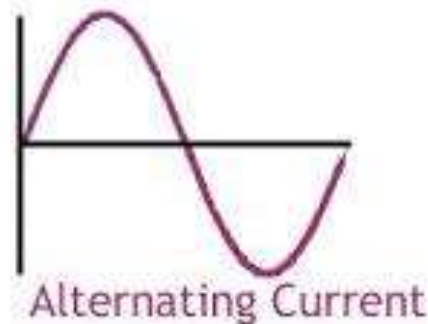
- DC current is used to **power electronics**
- DC current is easier to **store** (batteries)
- DC current is used in **mobile applications**
- **Inverters** convert **DC** to **AC**





b. AC CURRENT

- AC current is easier to distribute
 - Higher voltage and smaller current yields same power distributed
 - **Transformers** make it easy to **change voltage levels** so smaller wire can used
- AC is used for most machinery, lights and appliances
- Power supplies convert **AC to DC**





BASIC LAWS



- OHMS LAW
- KIRCHOFF'S LAW

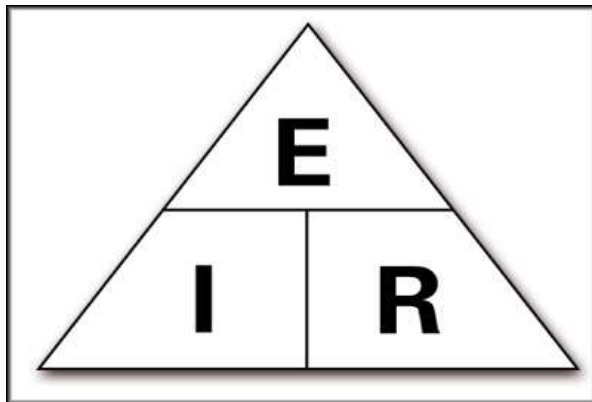


OHMS LAW

- **Ohm's Law** explains the relationship between **Voltage** (V), **Current** (I) and **Resistance** (R)

Definition:

States that at constant temperature, the current through a conductor between two points is directly proportional to the potential difference across the two points



$$V = I \times R$$

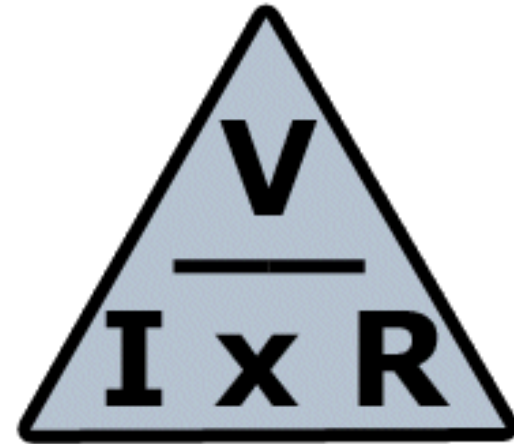


OHMS LAW TRIANGLE

- $V (E) = I \times R$

- $I = \frac{V}{R}$

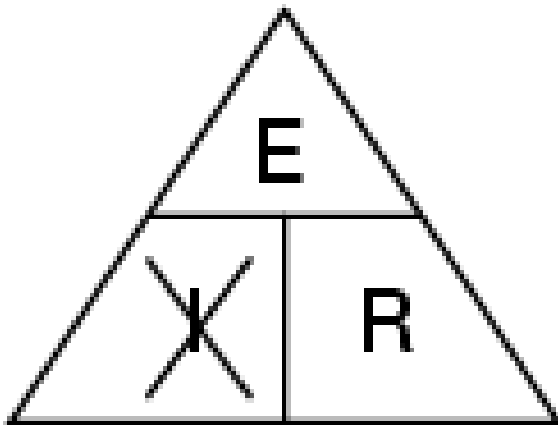
- $R = \frac{V}{I}$





How do calculate?

- Battery voltage is **12V**
- Current is **Amp ?**
- Resistance **2 Ohm**



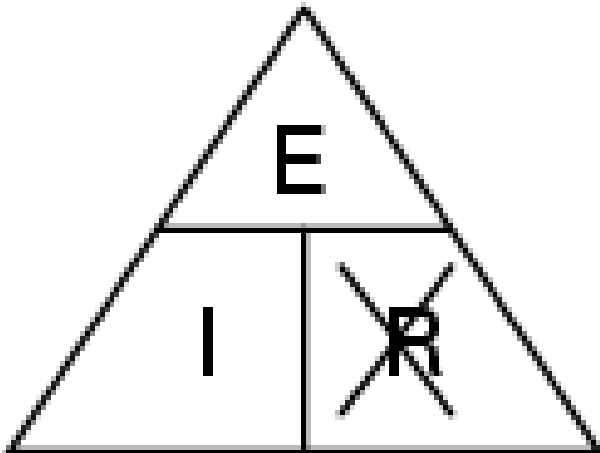
$$I = \frac{E}{R}$$





How to calculate?

- Voltage is **12V**
- Current is **4 Amps**
- Resistance **Ohms ?**

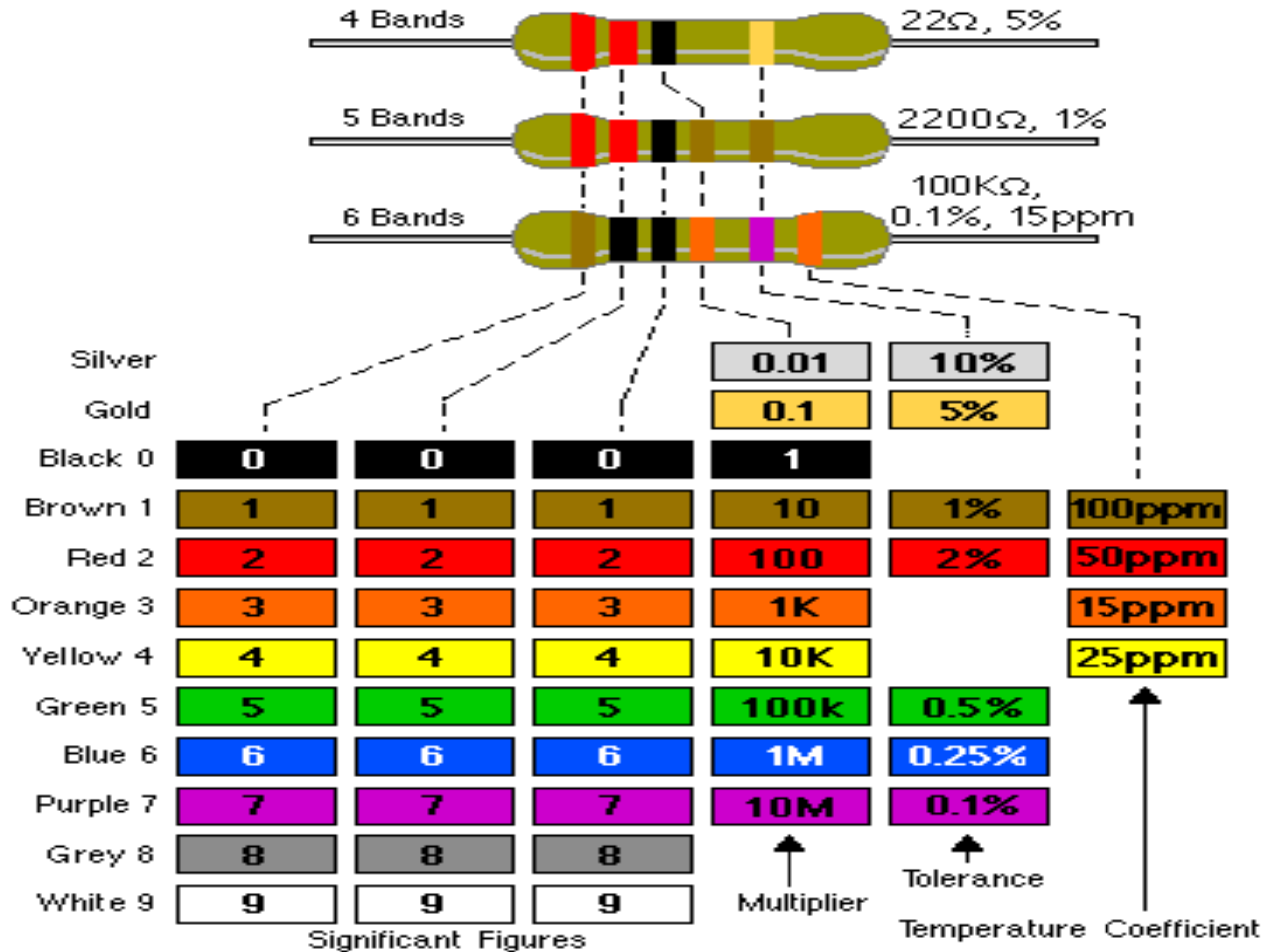


$$R = \frac{E}{I}$$





RESISTOR COLOR CHART

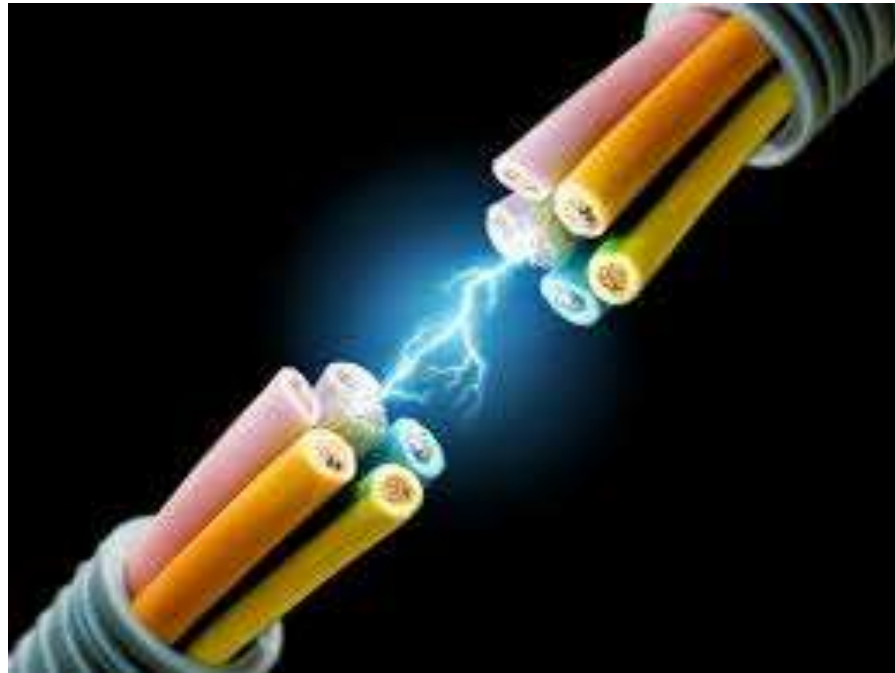


Resistor Color Code System





RECAP...



...THANK YOU