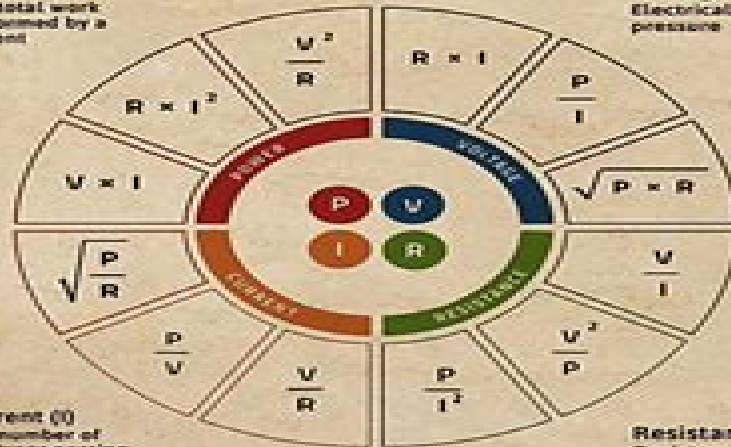


# BASIC ELECTRONICS THEORY

## Ohm's Law

**Power (P)**  
The total work performed by a current



## Basic Units

Quantity	Unit
Capacitance	F Farad
Charge	C Coulomb
Current	A Ampere
Energy	J Joule
Force	N Newton
Frequency	Hz Hertz
Inductance	H Henry
Magnetic Flux	Wb Weber
Potential	V Volt
Power	W Watt
Resistance	Ω Ohm

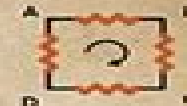
## Kirchhoff's Laws

### Closed Loop Rule

The directed sum of the electrical potential differences (voltage) around any closed circuit is zero.

$$\sum \Delta V_{\text{closed loop}} = 0$$

$$V_{AB} + V_{BC} + V_{CD} + V_{DA} = 0$$



### Junction Rule

The sum of currents entering the junction are thus equal to the sum of currents leaving.

$$\sum I_{\text{in}} = \sum I_{\text{out}}$$

$$I_1 = I_2 + I_3$$



## Resistor Network

**Series**  $R_t = R_1 + R_2 + R_3$



**Parallel**  $\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$



## Capacitor Network

**Series**  $\frac{1}{C_t} = \frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}$



**Parallel**  $C_t = C_1 + C_2 + C_3$

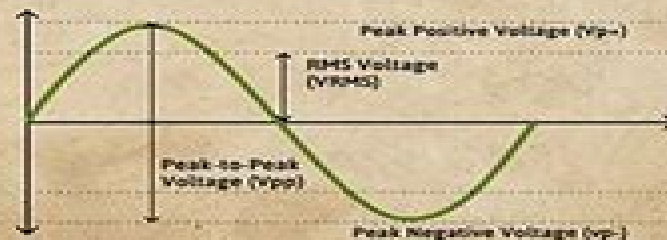


## Unit Prefixes

Tera-	T	$\times 10^{12}$	Milli-	m	$\times 10^{-3}$
Giga-	G	$\times 10^9$	Micro-	μ	$\times 10^{-6}$
Mega-	M	$\times 10^6$	Nano-	n	$\times 10^{-9}$
Kilo-	k	$\times 10^3$	Pico-	p	$\times 10^{-12}$
Hecto-	h	$\times 10^2$			
Deka-	Da	$\times 10^1$			
(base)	-	$\times 10^0$			
Deci-	d	$\times 10^{-1}$			
Centi-	c	$\times 10^{-2}$			

examples:  
 $25 \mu A = 25 \times 10^{-6} A = 0.000025 A$   
 $4.7 M\Omega = 4.7 \times 10^6 \Omega = 4,700,000 \Omega$

## Alternating Current



**Average AC Voltage**  
 $= 0.637 \times \text{Peak}$   
 $= 0.9 \times \text{RMS}$

**RMS AC Voltage**  
 $= 0.707 \times \text{Peak}$   
 $= 1.11 \times \text{Average}$

**Peak AC Voltage**  
 $= 1.414 \times \text{RMS}$   
 $= 1.57 \times \text{Average}$

# Electronic Fundamentals Study Guide

**Richard Bailey**



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*Electronic Fundamentals, Study Guide* W. McIntyre,1990-01-01      *Electronic Fundamentals* James T. McClave,1994

*Aviation Electronic Officer's Guide* United States. Navy Department. Bureau of Aeronautics,1958      **Catalog of**

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undergraduate and graduate students This book is also available as a set with Fundamentals of Solid State Electronics and Fundamentals of Solid State Electronics Study Guide

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