Scientific and Engineering Notation
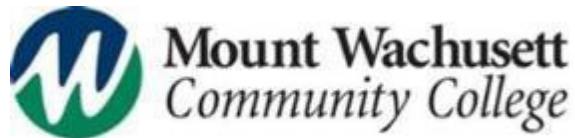
Disclaimer

Mount Wachusett Community College

AMMQC
Advanced Manufacturing Mechatronics and Quality Consortium

Prefixes and Conversions

- <u>Prefixes</u> : Are used to eliminate zeros from a given value.

- <u>Conversions</u> : Changes the numeric value of a measurement from one prefix's value to another prefix's value.

Prefixes and Conversions #1

PREFIX	SYMBOL	POWER OF TEN	VALVE
Tera	T	10^{12}	1,000,000,000,000
Giga	G	10^{9}	1,000,000,000
Mega	M	10^{6}	1,000,000
Kilo	K	10^{3}	1,000
milli	m	10^{-3}	0 .001
micro	μ	10^{-6}	0.000001
nano	n	10^{-9}	0.000000001
pico	p	10^{-12}	0.000000000001

Prefixes and Conversions #2

Whole Values are: VOLTS, AMPS, OHMS, FARAD, HERTZ etc.

Whole Values have all of the zeros or decimal places in their number value: 3000 volts   1000 amps

5,000,000 ohms   0.000001 farads

560,000 hertz

Prefixes are added to _whole value_ electrical measurements to eliminate zeros or decimal places:

3 K volts   1 K amps

5 M ohms   1 u farad

560 K Hertz

Prefixes and *Whole Values*

	Prefix	Symbol	Move decimal	Value
+ 6	Mega= 1,000,000	M	+ 6 places	1 M
+ 3	Kilo= 1,000	K	+ 3 places	1 K

"whole values" Amp, Volt, Ohm, Farad, Hertz

	Prefix	Symbol	Move decimal	Value
- 3	milli= 0.001	m	- 3 places	1 m
- 6	micro= 0.000001	u	- 6 places	1 u
- 9	nano = 0.000000001	n	- 9 places	1 n
- 12	pico= 0.000000000001	p	- 12 laces	1 p

Conversions: Example 1

Prefixes:	Symbol:
Mega = + 6	M
Kilo = + 3	K
Whole values = 0	
milli = - 3	m
micro = -6	u
nano = -9	n
pico = -12	p

Convert the following:

0   +6

5,000,000 ohms = _?_ M ohms

1. Determine the decimal places of each

2. Which prefix is larger ?   **M**

3. Which number will be larger / smaller?

Ohms   /   M ohms

4. Move the decimal to produce the correct answer.

6 places left

5,000,000. **= 5 M ohms**

Conversions: Example 2

Prefixes:	Symbol:
Mega = + 6	M
Kilo = + 3	K
Whole values = 0	
milli = - 3	m
micro = -6	u
nano = -9	n
pico = -12	p

Convert the following:

$$\overset{0}{0.000001 \text{ fd}} = \underset{}{\_?\_} \overset{-6}{\text{u fd}}$$

1. Determine the decimal places of each

2. Which prefix is larger ?   farad

3. Which number will be larger / smaller?
   u farad / farad

4. Move the decimal to produce the correct answer.

   6 places to right

   .000001 fd = 1 u fd