

## The Metric System and Scientific and Engineering Notations

### Prefixes

Tera-	Giga-	Mega-	Kilo-	Base Unit	Milli-	Micro-	Nano-	Pico-
(T)	(G)	(M)	(k)		(m)	( $\mu$ )	(n)	(p)
$10^{12}$	$10^9$	$10^6$	$10^3$		$10^{-3}$	$10^{-6}$	$10^{-9}$	$10^{-12}$
trillion	billion	million	thousand		thousandth	millionth	billionth	Trillionth

**Base Unit:** The base unit can be anything that measures volume, distance, wavelength, force, velocity, etc.

- **Scientific Notation** expresses a number as a power of 10 so that the significant digits are displayed with one digit to the left of the decimal.

**Example 1:** Express 36,000,000 in scientific notation.

Since the decimal point in the number is to the far right, the point needs to be moved 7 places to the left:  $3.6 \times 10^7$

**Example 2:** Express .0000523 in scientific notation.

Since the decimal point in the number is to the far left, the point needs to be moved 5 places to the right:  $5.23 \times 10^{-5}$

- **Engineering Notation** expresses a number as a power of 10 where the exponent of 10 is a multiple of 3. As a result, there may be 1, 2, or 3 significant digits to the left of the decimal place ( the significant digits form a number from 1 to 999.)

**Example 3:** Express 36,000,000 Amps in engineering notation.

Since the significant digits must form a number from 1 to 999, the decimal point must be moved 6 digits to the left:  $36 \times 10^6$  Amps  
Using the prefixes above, this can also be written as 36 MegaAmps.

**Example 4:** Express .0000523 watts in engineering notation.

In this case, the decimal point needs to be moved to the right 6 places:  $52.3 \times 10^{-6}$  watts  
Using the prefixes above, this can also be written as 52.3 microwatts.