Math Units – Powers of Ten

Prefix	Symbol	Multiplication factor	Exponent
Tera	T	1,000,000,000,000	10^{12}
Giga	G	1,000,000,000	10^{9}
Mega	M	1,000,000	10^{6}
Kilo	k	1,000	10^{3}
Hecto	h	100	10^{2}
Deca	da	10	10^{1}
Deci	d	0.1	10^{-1}
Centi	c	0.01	10^{-2}
Milli	m	0.001	10^{-3}
Micro	μ	0.000001	10^{-6}
Nano	n	0.000000001	10^{-9}
Pico	p	0.000000000001	10^{-12}

The units commonly used in radio are highlighted green or gray in the table above. Giga, mega, and kilo are commonly used with hertz (Hz). One kHz = 1,000 Hz, and one MHz = 1,000,000 Hz.

When the numbers get large, it's convenient to use a different prefix. So, when we talk about a frequency of more than 1 million Hz, we use MHz as shorthand to express how many million Hertz. This is why the frequencies of different bands are often expressed using different prefixes.

Milli, micro, nano, and pico are commonly used with amperes, volts, and farads. One millivolt = 0.001 of a volt. (0.001= one one-thousandth)

Converting units is a matter of moving decimal places. The number gets larger by 3 decimal places, or powers of 10, from kilo to mega, and from mega to giga. Similarly, the number gets smaller by 3 decimal places from milli to micro, micro to nano, and nano to pico.

So, if you remember the order going up (kilo, mega, giga) and going down (milli, micro, nano, pico) and remember that each step up or down is 3 decimal places, you can easily answer the questions correctly.

Question examples:

Which is equal to 3.525 MHz?

A. 0.003525 kHz

B. 35.25 kHz

C. 3525 kHz *Convert MHz (million) to kHz (thousand) by moving decimal 3 places*

D. 3,525,000 kHz

T5B01 (C)

How many milliamperes is 1.5 amperes?

A. 15 milliamperes

B. 150 milliamperes

C. 1500 milliamperes *milliampere = 0.001 of 1 ampere, so move decimal 3 places*

D. 15,000 milliamperes

T5B08 (B)

Which is equal to 1,000,000 picofarads?

A. 0.001 microfarads

B. 1 microfarad *pico to micro is 6 decimal places*

C. 1000 microfarads

D. 1,000,000,000 microfarads