Metric System
Technician 2018-2022

International System of Units (SI) – Metric Units				
Prefix	Symbol	Power	Exponent	Multiplication Factor
Tera	T	10^{12}	12	1,000,000,000,000
Giga	G	10^{9}	9	1,000,000,000
Mega	M	10^{6}	6	1,000,000
Kilo	k	10^{3}	3	1,000
Hecto	h	10^{2}	2	100
Deca	da	10^{1}	1	10
Unit	**none**	**10^{0}**	**0**	**1**
Deci	d	10^{-1}	-1	0.1
Centi	c	10^{-2}	-2	0.01
Milli	m	10^{-3}	-3	0.001
Micro	μ	10^{-6}	-6	0.000001
Nano	n	10^{-9}	-9	0.000000001
Pico	p	10^{-12}	-12	0.000000000001

Most "Metric Prefix" charts fail to show the units prefix but the unit prefix is very important. When calculating the movement of the decimal point when changing prefix, subtract the starting exponent from the final exponent. Remember that when you subtract a negative number you actually add (the absolute value of) the number. The result is the number of time that the decimal point is moved. If positive you move the decimal point to the left. If negative you move the decimal point to the right. Add any required zeroes.

Conversion examples:

Milliamps to amps: Milliamp exponent is -3. (Unit-)amp exponent is 0. 0-(-3) = 3. Move 3 places left.

0.000003 milliamps = 0.000000003 amps
0.003 milliamps = 0.000003 amps
3 milliamps = 0.003 amps
3,000 milliamps = 3 amps

Amps to milliamps: (Unit-) amp exponent is 0. Milliamp exponent is -3. (-3)-0 = -3. Move 3 places right.

0.000003 amps = 0.003 milliamps
0.003 amps = 3 milliamps
3 amps = 3,000 milliamps
3,000 amps = 3,000,000 milliamps

Kilohertz to megahertz: Kilo-hertz exponent is 3. Mega-hertz exponent is 6. 6-3 = 3. Move 3 places left.

0.000003 kilohertz = 0.000000003 megahertz
0.003 kilohertz = 0.000003 megahertz
3 kilohertz = 0.003 megahertz
3,000 kilohertz = 3 megahertz

Megahertz to kilohertz: Mega-hertz exponent is 6. Kilo-hertz exponent is 3. 3-6 = -3. Move 3 places right.

0.000003 megahertz = 0.003 kilohertz
0.003 megahertz = 3 kilohertz
3 megahertz = 3,000 kilohertz
3,000 megahertz = 3,000,000 kilohertz

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Picofarad to microfarad: Pico-farad exponent is -12. Micro-farad exponent is -6. (-6)-(-12) = 6. Move 6 places left.

0.003 picofarad = 0.000000003 microfarad
3 picofarad = 0.000003 microfarad
3,000 picofarad = 0.003 microfarad
3,000,000 picofarad = 3 microfarad

Microfarad to picofarad: Micro-farad exponent is -6. Pico-farad exponent is -12. (-12)-(-6) = -6. Move 6 places right.

0.000003 microfarad = 3 picofarad
0.003 microfarad = 3,000 picofarad
3 microfarad = 3,000,000 picofarad
3,000 microfarad = 3,000,000,000 picofarad

Volts to kilovolts: (Unit-) volts exponent is 0. Kilo-volts exponent is 3. 3-0 = 3. Move 3 places left.

0.003 volts = 0.000003 kilovolts
3 volts = 0.003 kilovolts
3,000 volts = 3 kilovolts
3,000,000 volts = 3,000 kilovolts

Kilovolts to volts: Kilo-volts exponent is 3. (Unit-)volts exponent is 0. 0-3 = -3. Move 3 places right.

0.000003 kilovolts = 0.003 volts
0.003 kilovolts = 3 volts
3 kilovolts = 3,000 volts
3,000 kilovolts = 3,000,000 volts

From the Technician question pool:

T5B01 How many milliamperes is 1.5 amperes?

Multiplication Factor for Milli (ampers) is:	10^{-3}	The Exponent is -3	(target)
Multiplication Factor for Unit (ampers) is:	10^{0}	The Exponent is 0	

Subtracting the Exponents gives: (-3) - 0 = -3

Negative means to move the decimal point 3 places to the right

1.500 amperes = 1,500 milliamperes

1,500 milliamperes (page 2-2)

T5B02 What is another way to specify a radio signal frequency of 1,500,000 hertz?

Multiplication Factor for Mega (hertz) is	10^{6}	The Exponent is 6	(target)
Multiplication Factor for Kilo (hertz) is	10^{3}	The Exponent is 3	
Multiplication Factor for Unit (hertz) is	10^{0}	The Exponent is 0	

Subtracting the Exponents gives 6-0 = 6 and Subtracting the Exponents gives 3-0 = 3

Positive means to move the decimal point: 6 places to the left 3 places to the left

1,500,000.0 hertz = 1.500000 megahertz and 1,500,000.0 hertz = 1,500.0 kilohertz

1500 kHz (page 2-2)

T5B03 How many volts are equal to one kilovolt?

The answer is in volts. Convert kilovolts to volts

Multiplication Factor for Unit (volts) is:	10^0	The Exponent is 0	(target)
Multiplication Factor for Kilo (volts) is:	10^3	The Exponent is 3	

Subtracting the Exponents gives: 0 – (3) = **-**3

Negative means to move the decimal point 3 places to the right

1**.**000 kilovolt = 1,000**.**0 volts

One thousand volts (page 2-2)

T5B04 How many volts are equal to one microvolt?

The answer is in volts. Convert microvolts to volts

Multiplication Factor for Unit (volts) is:	10^0	The Exponent is 0	(target)
Multiplication Factor for Micro (volts) is:	10^{-6}	The Exponent is **-**6	

Subtracting the Exponents gives: 0 - (**-**6) = 6

Positive means to move the decimal point 6 places to the left

1.0 microvolt = 0**.**000001 volts

One one-millionth of a volt (page 2-2)

T5B05 Which of the following is equivalent to 500 milliwatts?

All answers are in watts so convert milliwatts to watts.

Multiplication Factor for Unit (watts) is:	10^0	The Exponent is 0	(target)
Multiplication Factor for Milli (watts) is:	10^{-3}	The Exponent is **-**3	

Subtracting the Exponents gives: 0 - (**-**3) = 3

Positive means to move the decimal point 3 places to the left

500**.**0 milliwatts = 0**.**500 watts

0.5 watts (page 2-2)

T5B06 If an ammeter calibrated in amperes is used to measure a 3000-milliampere current, what reading would it show?

The answer is in amperes so convert milliamperes to amperes.

Multiplication Factor for Unit (amperes) is:	10^0	The Exponent is 0	(target)
Multiplication Factor for Milli (amperes) is:	10^{-3}	The Exponent is **-**3	

Subtracting the Exponents gives: 0 - (**-**3) = 3

Positive means to move the decimal point 3 places to the left

3,000**.**0 milliamperes = 3**.**000 amperes

3 amperes (page 2-2)

T5B07 If a frequency readout calibrated in megahertz shows a reading of 3.525 MHz, what would it show if it were calibrated in kilohertz?

The answer is in kilohertz so convert megahertz to kilohertz.

Multiplication Factor for Kilo (hertz) is:	10^3	The Exponent is 3	(target)
Multiplication Factor for Mega (hertz) is:	10^6	The Exponent is 6	

Subtracting the Exponents gives: 3 – 6 = **-**3

This means to move the decimal point 3 places to the right

3**.**525 megahertz = 3,525**.**0 kilohertz

3525 kHz (page 2-2)

T5B08 How many microfarads are 1,000,000 picofarads?

The answer is in microfarads so convert picofarads to microfarads.

Multiplication Factor for Micro (farad) is:	10^{-6}	The Exponent is **-**6	(target)
Multiplication Factor for Pico (farad) is:	10^{-12}	The Exponent is **-**12	

Subtracting the Exponents gives: (**-**6) - (**-**12) = 6

Positive means to move the decimal point 6 places to the left

1,000,000**.**0 picofarads = 1**.**000000 microfarads

1 microfarad (page 2-2)

T5B12 Which of the following frequencies is equal to 28,400 kHz?

28,400 kilohertz is not equal to 28**.**400 kilohertz so that answer is wrong. So it must be one of the other answers. The other answers are in megahertz so convert kilohertz to megahertz.

Multiplication Factor for Mega (hertz) is:	10^6	The Exponent is 6	(target)
Multiplication Factor for Kilo (hertz) is:	$10^{\mathbf{3}}$	The Exponent is 3	

Subtracting the Exponents gives: 6 - 3 = 3

Positive means to move the decimal point 3 places to the left

28,400**.**0 kilohertz = 28**.**400 megahertz

28.400 MHz (page 2-2)

T5B13 If a frequency readout shows a reading of 2425 MHz, what frequency is that in GHz?

The answer is in gigahertz so convert megahertz to gigahertz.

Multiplication Factor for Giga (hertz) is:	10^9	The Exponent is 9	(target)
Multiplication Factor for Micro (hertz) is:	$10^{\mathbf{6}}$	The Exponent is 6	

Subtracting the Exponents gives: 9 - 6 = 3

Positive means to move the decimal point 3 places to the left

2,425**.**0 megahertz = 2**.**425 gigahertz

2.425 GHz (page 2-2)