A-001-001-001 **(C)**

What is the meaning of the term "time constant" in an RL circuit ?

A The time required for the voltage in the circuit to build up to 63.2% of the maximum value
B The time required for the voltage in the circuit to build up to 36.8% of the maximum value
C The time required for the current in the circuit to build up to 63.2% of the maximum value
D The time required for the current in the circuit to build up to 36.8% of the maximum value

A-001-001-002 **(B)**

What is the term for the time required for the capacitor in an RC circuit to be charged to 63.2% of the supply voltage?

A One exponential period
B One time constant
C An exponential rate of one
D A time factor of one

A-001-001-003 **(C)**

What is the term for the time required for the current in an RL circuit to build up to 63.2% of the maximum value?

A A time factor of one
B One exponential rate
C One time constant
D An exponential period of one

A-001-001-004 **(B)**

What is the term for the time it takes for a charged capacitor in an RC circuit to discharge to 36.8% of its initial value of stored charge?

A One discharge period
B One time constant
C A discharge factor of one
D An exponential discharge of one

A-001-001-005 **(A)**

What is meant by "back EMF"?

A A voltage that opposes the applied EMF
B A current that opposes the applied EMF
C An opposing EMF equal to R times C percent of the applied EMF
D A current equal to the applied EMF

A-001-001-006 **(B)**

After two time constants, the capacitor in an RC circuit is charged to what percentage of the supply voltage?

A 36.8%
B 86.5%
C 63.2%
D 95%

A-001-001-007 **(B)**

After two time constants, the capacitor in an RC circuit is discharged to what percentage of the starting voltage?

A 63.2%
B 13.5%
C 36.8%
D 86.5%

A-001-001-008 **(D)**

What is the time constant of a circuit having a 100 microfarad capacitor in series with a 470 kilohm resistor?

A 4700 seconds
B 470 seconds
C 0.47 seconds
D 47 seconds

A-001-001-009 **(B)**

What is the time constant of a circuit having a 470 microfarad capacitor in series with a 470 kilohm resistor?

A 470 seconds
B 221 seconds
C 221 000 seconds
D 47 000 seconds

A-001-001-010 **(D)**

What is the time constant of a circuit having a 220 microfarad capacitor in series with a 470 kilohm resistor?

A 470 000 seconds
B 470 seconds
C 220 seconds
D 103 seconds

A-001-002-001 **(A)**

What is the result of skin effect?

A As frequency increases, RF current flows in a thinner layer of the conductor, closer to the surface
B As frequency decreases, RF current flows in a thinner layer of the conductor, closer to the surface
C Thermal effects on the surface of the conductor increase impedance
D Thermal effects on the surface of the conductor decrease impedance

A-001-002-002 **(B)**

What effect causes most of an RF current to flow along the surface of a conductor?

A Layer effect
B Skin effect
C Piezoelectric effect
D Resonance effect

A-001-002-003 **(B)**

Where does almost all RF current flow in a conductor?

A In the centre of the conductor
B Along the surface of the conductor
C In a magnetic field in the centre of the conductor
D In a magnetic field around the conductor

A-001-002-004 **(B)**

Why does most of an RF current flow within a very thin layer under the conductor's surface?

A Because of heating of the conductor's interior
B Because of skin effect
C Because the RF resistance of a conductor is much less than the DC resistance
D Because a conductor has AC resistance due to self-inductance

A-001-002-005 **(B)**

Why is the resistance of a conductor different for RF currents than for direct currents?

A Because the insulation conducts current at high frequencies
B Because of skin effect
C Because of the Hertzberg effect
D Because conductors are non-linear devices

A-001-002-006 **(A)**

What unit measures the ability of a capacitor to store electrical charge?

A Farad
B Coulomb
C Watt
D Volt

A-001-002-007 **(B)**

A wire has a current passing through it. Surrounding this wire there is:

A a skin effect that diminishes with distance
B an electromagnetic field
C an electrostatic field
D a cloud of electrons

A-001-002-008 **(A)**

In what direction is the magnetic field oriented about a conductor in relation to the direction of electron flow?

A In the direction determined by the left-hand rule
B In all directions
C In the same direction as the current
D In the direct opposite to the current

A-001-002-009 **(D)**

What is the term for energy that is stored in an electromagnetic or electrostatic field?

A Kinetic energy
B Ampere-joules
C Joule-coulombs
D Potential energy

A-001-002-010 **(D)**

Between the charged plates of a capacitor there is:

A a magnetic field
B a cloud of electrons
C an electric current
D an electrostatic field

A-001-002-011 **(C)**

Energy is stored within an inductor that is carrying a current. The amount of energy depends on this current, but it also depends on a property of the inductor. This property has the following unit:

A farad
B watt
C henry
D coulomb

A-001-003-001 **(C)**

What is the resonant frequency of a series RLC circuit if R is 47 ohms, L is 50 microhenrys and C is 40 picofarads?

A 7.96 MHz
B 79.6 MHz
C 3.56 MHz
D 1.78 MHz

A-001-003-002 **(D)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 40 microhenrys and C is 200 picofarads?

A 1.99 kHz
B 1.99 MHz
C 1.78 kHz
D 1.78 MHz

A-001-003-003 **(D)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 50 microhenrys and C is 10 picofarads?

A 7.12 kHz
B 3.18 MHz
C 3.18 kHz
D 7.12 MHz

A-001-003-004 **(A)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 25 microhenrys and C is 10 picofarads?

A 10.1 MHz
B 63.7 MHz
C 10.1 kHz
D 63.7 kHz

A-001-003-005 **(A)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 3 microhenrys and C is 40 picofarads?

A 14.5 MHz
B 13.1 MHz
C 13.1 kHz
D 14.5 kHz

A-001-003-006 **(C)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 4 microhenrys and C is 20 picofarads?

A 19.9 kHz
B 17.8 kHz
C 17.8 MHz
D 19.9 MHz

A-001-003-007 **(B)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 8 microhenrys and C is 7 picofarads?

A 2.13 MHz
B 21.3 MHz
C 28.4 MHz
D 2.84 MHz

A-001-003-008 **(C)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 3 microhenrys and C is 15 picofarads?

A 35.4 kHz
B 23.7 kHz
C 23.7 MHz
D 35.4 MHz

A-001-003-009 **(C)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 4 microhenrys and C is 8 picofarads?

A 49.7 kHz
B 28.1 kHz
C 28.1 MHz
D 49.7 MHz

A-001-003-010 **(B)**

What is the resonant frequency of a series RLC circuit, if R is 47 ohms, L is 1 microhenry and C is 9 picofarads?

A 1.77 MHz
B 53.1 MHz
C 5.31 MHz
D 17.7 MHz

A-001-003-011 **(A)**

What is the value of capacitance (C) in a series R-L-C circuit, if the circuit resonant frequency is 14.25 MHz and L is 2.84 microhenrys?

A 44 picofarads
B 2.2 microfarads
C 44 microfarads
D 2.2 picofarads

A-001-004-001 **(D)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 1 microhenry and C is 10 picofarads?

A 15.9 kHz
B 50.3 kHz
C 15.9 MHz
D 50.3 MHz

A-001-004-002 **(D)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 2 microhenrys and C is 15 picofarads?

A 29.1 kHz
B 5.31 MHz
C 5.31 kHz
D 29.1 MHz

A-001-004-003 **(C)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 5 microhenrys and C is 9 picofarads?

A 3.54 MHz
B 3.54 kHz
C 23.7 MHz
D 23.7 kHz

A-001-004-004 **(B)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 2 microhenrys and C is 30 picofarads?

A 20.5 kHz
B 20.5 MHz
C 2.65 MHz
D 2.65 kHz

A-001-004-005 **(A)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 15 microhenrys and C is 5 picofarads?

A 18.4 MHz
B 2.12 kHz
C 2.12 MHz
D 18.4 kHz

A-001-004-006 **(D)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 3 microhenrys and C is 40 picofarads?

A 1.33 kHz
B 1.33 MHz
C 14.5 kHz
D 14.5 MHz

A-001-004-007 **(A)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 40 microhenrys and C is 6 picofarads?

A 10.3 MHz
B 6.63 MHz
C 6.63 kHz
D 10.3 kHz

A-001-004-008 **(D)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 10 microhenrys and C is 50 picofarads?

A 7.12 kHz
B 3.18 MHz
C 3.18 kHz
D 7.12 MHz

A-001-004-009 **(D)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 200 microhenrys and C is 10 picofarads?

A 3.56 kHz
B 7.96 MHz
C 7.96 kHz
D 3.56 MHz

A-001-004-010 **(D)**

What is the resonant frequency of a parallel RLC circuit if R is 4.7 kilohms, L is 90 microhenrys and C is 100 picofarads?

A 1.77 kHz
B 1.77 MHz
C 1.68 kHz
D 1.68 MHz

A-001-004-011 **(C)**

What is the value of inductance (L) in a parallel RLC circuit, if the resonant frequency is 14.25 MHz and C is 44 picofarads?

A 3.9 millihenrys
B 0.353 microhenry
C 2.8 microhenrys
D 253.8 millihenrys

A-001-005-001 **(D)**

What is the Q of a parallel RLC circuit, if it is resonant at 14.128 MHz, L is 2.7 microhenrys and R is 18 kilohms?

A 7.51
B 0.013
C 71.5
D 75.1

A-001-005-002 **(B)**

What is the Q of a parallel RLC circuit, if it is resonant at 14.128 MHz, L is 4.7 microhenrys and R is 18 kilohms?

A 4.31
B 43.1
C 13.3
D 0.023

A-001-005-003 **(B)**

What is the Q of a parallel RLC circuit, if it is resonant at 4.468 MHz, L is 47 microhenrys and R is 180 ohms?

A 13.3
B 0.136
C 7.35
D 0.00735

A-001-005-004 **(B)**

What is the Q of a parallel RLC circuit, if it is resonant at 14.225 MHz, L is 3.5 microhenrys and R is 10 kilohms?

A 71.5
B 31.9
C 7.35
D 0.0319

A-001-005-005 **(B)**

What is the Q of a parallel RLC circuit, if it is resonant at 7.125 MHz, L is 8.2 microhenrys and R is 1 kilohm?

A 0.273
B 2.73
C 36.8
D 0.368

A-001-005-006 **(A)**

What is the Q of a parallel RLC circuit, if it is resonant at 7.125 MHz, L is 10.1 microhenrys and R is 100 ohms?

A 0.221
B 22.1
C 0.00452
D 4.52

A-001-005-007 **(A)**

What is the Q of a parallel RLC circuit, if it is resonant at 7.125 MHz, L is 12.6 microhenrys and R is 22 kilohms?

A 39
B 22.1
C 0.0256
D 25.6

A-001-005-008 **(D)**

What is the Q of a parallel RLC circuit, if it is resonant at 3.625 MHz, L is 3 microhenrys and R is 2.2 kilohms?

A 25.6
B 31.1
C 0.031
D 32.2

A-001-005-009 **(C)**

What is the Q of a parallel RLC circuit, if it is resonant at 3.625 MHz, L is 42 microhenrys and R is 220 ohms?

A 4.35
B 0.00435
C 0.23
D 2.3

A-001-005-010 **(C)**

What is the Q of a parallel RLC circuit, if it is resonant at 3.625 MHz, L is 43 microhenrys and R is 1.8 kilohms?

A 54.3
B 23
C 1.84
D 0.543

A-001-005-011 **(A)**

Why is a resistor often included in a parallel resonant circuit ?

A To decrease the Q and increase the bandwidth
B To increase the Q and decrease the skin effect
C To decrease the Q and increase the resonant frequency
D To increase the Q and decrease bandwidth

A-002-001-001 **(D)**

What two elements widely used in semiconductor devices exhibit both metallic and non-metallic characteristics?

A Galena and germanium
B Galena and bismuth
C Silicon and gold
D Silicon and germanium

A-002-001-002 **(C)**

In what application is gallium-arsenide used as a semiconductor material in preference to germanium or silicon?

A At very low frequencies
B In bipolar transistors
C At microwave frequencies
D In high-power circuits

A-002-001-003 **(C)**

What type of semiconductor material contains fewer free electrons than pure germanium or silicon crystals?

A Bipolar type
B Superconductor type
C P-type
D N-type

A-002-001-004 **(A)**

What type of semiconductor material contains more free electrons than pure germanium or silicon crystals?

A N-type
B P-type
C Bipolar
D Superconductor