A-002-009-003 **(D)**

What occurs when an excessive amount of signal energy reaches the mixer circuit?

A Automatic limiting occurs
B A beat frequency is generated
C Mixer blanking occurs
D Spurious signals are generated

A-002-009-004 **(D)**

In a frequency multiplier circuit, the input signal is coupled to the base of a transistor through a capacitor. A radio frequency choke is connected between the base of the transistor and ground. The capacitor is:

A part of the input tuned circuit
B a by-pass for the circuit
C part of the output tank circuit
D a DC blocking capacitor

A-002-009-005 **(A)**

A frequency multiplier circuit must be operated in:

A class C
B class AB
C class B
D class A

A-002-009-006 **(A)**

In a frequency multiplier circuit, an inductance (L1) and a variable capacitor (C2) are connected in series between VCC+ and ground. The collector of a transistor is connected to a tap on L1. The purpose of the variable capacitor is to:

A tune L1 to the desired harmonic
B by-pass RF
C tune L1 to the frequency applied to the base
D provide positive feedback

A-002-009-007 **(C)**

In a frequency multiplier circuit, an inductance (L1) and a variable capacitor (C2) are connected in series between VCC+ and ground. The collector of a transistor is connected to a tap on L1. A fixed capacitor (C3) is connected between the VCC+ side of L1 and ground. The purpose of C3 is to:

A resonate with L1
B by-pass any audio components
C provide an RF ground at the VCC connection point of L1
D form a pi filter with L1 and C2

A-002-009-008 **(D)**

In a frequency multiplier circuit, an inductance (L1) and a variable capacitor (C2) are connected in series between VCC+ and ground. The collector of a transistor is connected to a tap on L1. C2 in conjunction with L1 operate as a:

A frequency divider
B voltage divider
C voltage doubler
D frequency multiplier

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

In a circuit where the components are tuned to resonate at a higher frequency than applied, the circuit is most likely a:

A a VHF/UHF amplifier
B a linear amplifier
C a frequency divider
D a frequency multiplier

A-002-009-010 **(C)**

In a frequency multiplier circuit, an inductance (L1) and a variable capacitor (C2) are connected in series between VCC+ and ground. The collector of a transistor is connected to a tap on L1. A fixed capacitor (C3) is connected between the VCC+ side of L1 and ground. C3 is a:

A tuning capacitor
B coupling capacitor
C RF by-pass capacitor
D DC blocking capacitor

A-002-009-011 **(A)**

What stage in a transmitter would change a 5.3-MHz input signal to 14.3 MHz?

A A mixer
B A linear translator
C A frequency multiplier
D A beat frequency oscillator

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

What is a NAND gate?

A A circuit that produces a logic "1" at its output only when all inputs are logic "1"
B A circuit that produces a logic "0" at its output if some but not all of its inputs are logic "1"
C A circuit that produces a logic "0" at its output only when all inputs are logic "0"
D A circuit that produces a logic "0" at its output only when all inputs are logic "1"

A-002-010-002 **(B)**

What is an OR gate?

A A circuit that produces a logic "0" at its output if any input is logic "1"
B A circuit that produces a logic "1" at its output if any input is logic "1"
C A circuit that produces a logic "0" at its output if all inputs are logic "1"
D A circuit that produces logic "1" at its output if all inputs are logic "0"

A-002-010-003 **(D)**

What is a NOR gate?

A A circuit that produces a logic "0" at its output only if all inputs are logic "0"
B A circuit that produces a logic "1" at its output only if all inputs are logic "1"
C A circuit that produces a logic "1" at its output if some but not all of its inputs are logic "1"
D A circuit that produces a logic "0" at its output if any or all inputs are logic "1"

A-002-010-004 **(C)**

What is a NOT gate (also known as an INVERTER)?

A A circuit that allows data transmission only when its input is high
B A circuit that produces a logic "1" at its output when the input is logic "1"
C A circuit that produces a logic "0" at its output when the input is logic "1"
D A circuit that does not allow data transmission when its input is high

A-002-010-005 **(B)**

What is an EXCLUSIVE OR gate?

A A circuit that produces a logic "1" at its output when all of the inputs are logic "0"
B A circuit that produces a logic "1" at its output when only one of the inputs is logic "1"
C A circuit that produces a logic "0" at its output when only one of the inputs is logic "1"
D A circuit that produces a logic "1" at its output when all of the inputs are logic "1"

A-002-010-006 **(C)**

What is an EXCLUSIVE NOR gate?

A A circuit that produces a logic "1" at its output when only one of the inputs are logic "1"
B A circuit that produces a logic "0" at its output when all of the inputs are logic "1"
C A circuit that produces a logic "1" at its output when all of the inputs are logic "1"
D A circuit that produces a logic "1" at its output when only one of the inputs is logic "0"

A-002-010-007 **(B)**

What is an AND gate?

A A circuit that produces a logic "1" at its output if all inputs are logic "0"
B A circuit that produces a logic "1" at its output only if all its inputs are logic "1"
C A circuit that produces a logic "1" at the output if at least one input is a logic "0"
D A circuit that produces a logic "1" at its output only if one of its inputs is logic "1"

A-002-010-008 **(D)**

What is a flip-flop circuit?

A A binary sequential logic element with eight stable states
B A binary sequential logic element with four stable states
C A binary sequential logic element with one stable state
D A binary sequential logic element with two stable states

A-002-010-009 **(D)**

What is a bistable multivibrator?

A An OR gate
B An AND gate
C A clock
D A flip-flop

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

What type of digital logic is also known as a latch?

A A decade counter
B An OR gate
C An op-amp
D A flip-flop

A-002-010-011 **(D)**

In a multivibrator circuit, when one transistor conducts, the other is:

A saturated
B reverse-biased
C forward-biased
D cut off

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

What is a crystal lattice filter?

A A filter with wide bandwidth and shallow skirts made using quartz crystals
B An audio filter made with four quartz crystals that resonate at 1 kHz intervals
C A power supply filter made with interlaced quartz crystals
D A filter with narrow bandwidth and steep skirts made using quartz crystals

A-002-011-002 **(A)**

What factor determines the bandwidth and response shape of a crystal lattice filter?

A The relative frequencies of the individual crystals
B The centre frequency chosen for the filter
C The gain of the RF stage following the filter
D The amplitude of the signals passing through the filter

A-002-011-003 **(D)**

For single-sideband phone emissions, what would be the bandwidth of a good crystal lattice filter?

A 15 kHz
B 500 Hz
C 6 kHz
D 2.4 kHz

A-002-011-004 **(A)**

The main advantage of a crystal oscillator over a tuned LC oscillator is:

A much greater frequency stability
B longer life under severe operating use
C freedom from harmonic emissions
D simplicity

A-002-011-005 **(D)**

A quartz crystal filter is superior to an LC filter for narrow bandpass applications because of the:

A crystal's low Q
B LC circuit's high Q
C crystal's simplicity
D crystal's high Q

A-002-011-006 **(B)**

Piezoelectricity is generated by:

A moving a magnet near a crystal
B deforming certain crystals
C touching crystals with magnets
D adding impurities to a crystal

A-002-011-007 **(B)**

Electrically, what does a crystal look like?

A A variable tuned circuit
B A very high Q tuned circuit
C A very low Q tuned circuit
D A variable capacitance

A-002-011-008 **(A)**

Crystals are sometimes used in a circuit which has an output close to an integral multiple of the crystal frequency. This circuit is called:

A an overtone oscillator
B a crystal multiplier
C a crystal lattice
D a crystal ladder

A-002-011-009 **(D)**

Which of the following properties does not apply to a crystal when used in an oscillator circuit?

A Good frequency stability
B Very low noise because of high Q
C Good frequency accuracy
D High power output

A-002-011-010 **(C)**

Crystal oscillators, filters and microphones depend upon which principle?

A Ferro-resonance
B Overtone effect
C Piezoelectric effect
D Hertzberg effect

A-002-011-011 **(D)**

Crystals are not applicable to which of the following?

A Microphones
B Lattice filters
C Oscillators
D Active filters

A-002-012-001 **(D)**

What are the three general groupings of filters?

A Hartley, Colpitts and Pierce
B Audio, radio and capacitive
C Inductive, capacitive and resistive
D High-pass, low-pass and band-pass

A-002-012-002 **(A)**

What are the distinguishing features of a Butterworth filter?

A It has a maximally flat response over its pass-band
B The product of its series and shunt-element impedances is a constant for all frequencies
C It only requires conductors
D It only requires capacitors

A-002-012-003 **(B)**

Which filter type is described as having ripple in the passband and a sharp cutoff?

A A Butterworth filter
B A Chebyshev filter
C An active LC filter
D A passive op-amp filter

A-002-012-004 **(A)**

What are the distinguishing features of a Chebyshev filter?

A It allows ripple in the passband in return for steeper skirts
B It requires only inductors
C It requires only capacitors
D It has a maximally flat response in the passband

A-002-012-005 **(B)**

Resonant cavities are used by amateurs as a:

A high-pass filter above 30 MHz
B narrow bandpass filter at VHF and higher frequencies
C power line filter
D low-pass filter below 30 MHz

A-002-012-006 **(D)**

On VHF and above, 1/4 wavelength coaxial cavities are used to give protection from high-level signals. For a frequency of approximately 50 MHz, the diameter of such a device would be about 10 cm (4 in). What would be its approximate length?

A 0.6 metres (2 ft)
B 2.4 metres (8 ft)
C 3.7 metres (12 ft)
D 1.5 metres (5 ft)

A-002-012-007 **(A)**

A device which helps with receiver overload and spurious responses at VHF, UHF and above may be installed in the receiver front end. It is called a:

A helical resonator
B diplexer
C directional coupler
D duplexer

A-002-012-008 **(A)**

Where you require bandwidth at VHF and higher frequencies about equal to a television channel, a good choice of filter is the:

A none of the other answers
B resonant cavity
C Butterworth
D Chebyshev

A-002-012-009 **(D)**

What is the primary advantage of the Butterworth filter over the Chebyshev filter?

A It allows ripple in the passband in return for steeper skirts
B It requires only inductors
C It requires only capacitors
D It has maximally flat response over its passband

A-002-012-010 **(B)**

What is the primary advantage of the Chebyshev filter over the Butterworth filter?

A It has maximally flat response over the passband
B It allows ripple in the passband in return for steeper skirts
C It requires only capacitors
D It requires only inductors

A-002-012-011 **(D)**

Which of the following filter types is not suitable for use at audio and low radio frequencies?

A Elliptical
B Chebyshev
C Butterworth
D Cavity

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

What is the easiest amplitude dimension to measure by viewing a pure sine wave on an oscilloscope?

A RMS voltage
B Average voltage
C Peak-to-peak voltage
D Peak voltage

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

What is the RMS value of a 340 volt peak-to-peak pure sine wave?

A 300 volts
B 120 volts
C 170 volts
D 240 volts

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

What is the equivalent to the RMS value of an AC voltage?

A The AC voltage found by taking the square root of the peak AC voltage
B The DC voltage causing the same heating of a given resistor as the peak AC voltage
C The AC voltage found by taking the square root of the average AC value
D The AC voltage causing the same heating of a given resistor as a DC voltage of the same value

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

If the peak value of a 100 Hz sinusoidal waveform is 20 volts, the RMS value is:

A 16.38 volts
B 14.14 volts
C 28.28 volts
D 7.07 volts

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

In applying Ohm's law to AC circuits, current and voltage values are:

A none of the proposed answers
B peak values times 0.707
C average values
D average values times 1.414

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

The effective value of a sine wave of voltage or current is:

A 100% of the maximum value
B 63.6% of the maximum value
C 70.7% of the maximum value
D 50% of the maximum value

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

AC voltmeter scales are usually calibrated to read:

A peak voltage
B instantaneous voltage
C average voltage
D RMS voltage

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

An AC voltmeter is calibrated to read the:

A peak value
B effective value
C peak-to-peak value
D average value

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

Which AC voltage value will produce the same amount of heat as a DC voltage, when applied to the same resistance?

A The peak value
B The peak-to-peak value
C The RMS value
D The average value

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

What is the peak-to-peak voltage of a sine wave that has an RMS voltage of 120 volts?

A 204.8 volts
B 339.5 volts
C 84.8 volts
D 169.7 volts

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

A sine wave of 17 volts peak is equivalent to how many volts RMS?

A 12 volts
B 24 volts
C 34 volts
D 8.5 volts

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

The power supplied to the antenna transmission line by a transmitter during an RF cycle at the highest crest of the modulation envelope is known as:

A carrier power
B full power
C peak-envelope power
D mean power

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

To compute one of the following, multiply the peak-envelope voltage by 0.707 to obtain the RMS value, square the result and divide by the load resistance. Which is the correct answer?

A ERP
B power factor
C PEP
D PIV

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

Peak-Envelope Power (PEP) for SSB transmission is:

A equal to the RMS power
B a hypothetical measurement
C Peak-Envelope Voltage (PEV) multiplied by 0.707, squared and divided by the load resistance
D peak-voltage multiplied by peak current

A-003-002-004 **(C)**

The formula to be used to calculate the power output of a transmitter into a resistor load using a voltmeter is:

A P = EI cos 0
B P = IR
C P = (E exponent 2) /R
D P = EI/R