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

Why must a very stable reference oscillator be used as part of a phase-locked loop (PLL) frequency synthesizer?

A Any phase variations in the reference oscillator signal will produce phase noise in the synthesizer output

B Any phase variations in the reference oscillator signal will produce harmonic distortion in the modulating signal

C Any amplitude variations in the reference oscillator signal will prevent the loop from changing frequency

D Any amplitude variations in the reference oscillator signal will prevent the loop from locking to the desired signal

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

Positive feedback from a capacitive divider indicates the oscillator type is:

A Miller

B Colpitts

C Pierce

D Hartley

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

In an RF oscillator circuit designed for high stability, the positive feedback is drawn from two capacitors connected in series. These two capacitors would most likely be:

A Mylar

B silver mica

C ceramic

D electrolytics

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

In an oscillator circuit where positive feedback is obtained through a single capacitor in series with the crystal, the type of oscillator is:

A Hartley

B Miller

C Pierce

D Colpitts

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

A circuit depending on positive feedback for its operation would be a:

A mixer

B detector

C audio amplifier

D variable-frequency oscillator

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

An apparatus with an oscillator and a class C amplifier would be:

A a two-stage frequency-modulated transmitter

B a two-stage regenerative receiver

C a two-stage CW transmitter

D a fixed-frequency single-sideband transmitter

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

In an oscillator where positive feedback is provided through a capacitor in series with a crystal, that type of oscillator is a:

A Pierce

B Colpitts

C Hartley

D Franklin

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

The output tuning controls on a transmitter power amplifier with an adjustable PI network:

A allow efficient transfer of power to the antenna

B allow switching to different antennas

C reduce the possibility of cross-modulation in adjunct receivers

D are involved with frequency multiplication in the previous stage

A-005-002-002 **(C)**

The purpose of using a centre-tap return connection on the secondary of transmitting tube's filament transformer is to:

A keep the output voltage constant with a varying load

B obtain optimum power output

C prevent modulation of the emitted wave by the alternating current filament supply

D reduce the possibility of harmonic emissions

A-005-002-003 **(B)**

In a grounded grid amplifier using a triode vacuum tube, the input signal is applied to:

A the filament leads
B the cathode
C the plate
D the control grid

A-005-002-004 **(A)**

In a grounded grid amplifier using a triode vacuum tube, the plate is connected to the pi-network through a:

A blocking capacitor
B by-pass capacitor
C tuning capacitor
D electrolytic capacitor

A-005-002-005 **(C)**

In a grounded grid amplifier using a triode vacuum tube, the plate is connected to a radio frequency choke. The other end of the radio frequency choke connects to the:

A ground
B B- (bias)
C B+ (high voltage)
D filament voltage

A-005-002-006 **(B)**

In a grounded grid amplifier using a triode vacuum tube, the cathode is connected to a radio frequency choke. The other end of the radio frequency choke connects to the:

A B+ (high voltage)
B B- (bias)
C ground
D filament voltage

A-005-002-007 **(C)**

In a grounded grid amplifier using a triode vacuum tube, the secondary winding of a transformer is connected directly to the vacuum tube. This transformer provides:

A B+ (high voltage)
B Screen voltage
C filament voltage
D B- (bias)

A-005-002-008 **(C)**

In a grounded grid amplifier using a triode vacuum tube, what would be the approximate B+ voltage required for an output of 400 watts at 400 mA with approximately 50 percent efficiency?

A 3000 volts
B 1000 volts
C 2000 volts
D 500 volts

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

In a grounded grid amplifier using a triode vacuum tube, each side of the filament is connected to a capacitor whose other end is connected to ground. These are:

A tuning capacitors
B electrolytic capacitors
C blocking capacitors
D by-pass capacitors

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

After you have opened a VHF power amplifier to make internal tuning adjustments, what should you do before you turn the amplifier on?

A Remove all amplifier shielding to ensure maximum cooling
B Be certain all amplifier shielding is fastened in place
C Make sure that the power interlock switch is bypassed so you can test the amplifier
D Be certain no antenna is attached so that you will not cause any interference

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

Harmonics produced in an early stage of a transmitter may be reduced in a later stage by:

A greater input to the final stage
B transistors instead of tubes
C tuned circuit coupling between stages
D larger value coupling capacitors

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

In a simple 2 stage CW transmitter circuit, the oscillator stage and the class C amplifier stage are inductively coupled by a RF transformer. Another role of the RF transformer is to:

A provide the necessary feedback for oscillation
B act as part of a balanced mixer
C be part of a tuned circuit
D act as part of a pi filter

A-005-003-002 **(D)**

In a simple 2 stage CW transmitter, current to the collector of the transistor in the class C amplifier stage flows through a radio frequency choke (RFC) and a tapped inductor. The RFC, on the tapped inductor side, is also connected to grounded capacitors. The purpose of the RFC and capacitors is to:

A provide negative feedback
B form a key-click filter
C form a RF-tuned circuit
D form a low-pass filter

A-005-003-003 **(C)**

In a simple 2 stage CW transmitter, the transistor in the second stage would act as:

A the master oscillator
B an audio oscillator
C a power amplifier
D a frequency multiplier

A-005-003-004 **(D)**

An advantage of keying the buffer stage in a transmitter is that:

A key clicks are eliminated
B the radiated bandwidth is restricted
C high RF voltages are not present
D changes in oscillator frequency are less likely

A-005-003-005 **(D)**

As a power amplifier is tuned, what reading on its grid current meter indicates the best neutralization?

A Minimum grid current
B Maximum grid current
C A maximum change in grid current as the output circuit is changed
D A minimum change in grid current as the output circuit is changed

A-005-003-006 **(A)**

What does a neutralizing circuit do in an RF amplifier?

A It cancels the effects of positive feedback
B It eliminates AC hum from the power supply
C It reduces incidental grid modulation
D It controls differential gain

A-005-003-007 **(A)**

What is the reason for neutralizing the final amplifier stage of a transmitter?

A To eliminate parasitic oscillations
B To limit the modulation index
C To cut off the final amplifier during standby periods
D To keep the carrier on frequency

A-005-003-008 **(B)**

Parasitic oscillations are usually generated due to:

A a mismatch between power amplifier and transmission line
B accidental resonant frequencies in the power amplifier
C harmonics from some earlier multiplier stage
D excessive drive or excitation to the power amplifier

A-005-003-009 **(C)**

Parasitic oscillations would tend to occur mostly in:

A high voltage rectifiers
B mixer stages
C RF power output stages
D high gain audio output stages

A-005-003-010 **(C)**

Why is neutralization necessary for some vacuum-tube amplifiers?

A To cancel AC hum from the filament transformer
B To reduce the limits of loaded Q
C To cancel oscillation caused by the effects of interelectrode capacitance
D To reduce grid-to-cathode leakage

A-005-003-011 **(D)**

Parasitic oscillations in an RF power amplifier may be caused by:

A overdriven stages
B poor voltage regulation
C excessive harmonic production
D lack of neutralization

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

What type of signal does a balanced modulator produce?

A FM with balanced deviation
B Full carrier
C Single sideband, suppressed carrier
D Double sideband, suppressed carrier

A-005-004-002 **(B)**

How can a single-sideband phone signal be produced?

A By using a reactance modulator followed by a mixer
B By using a balanced modulator followed by a filter
C By driving a product detector with a DSB signal
D By using a loop modulator followed by a mixer

A-005-004-003 **(A)**

Carrier suppression in a single-sideband transmitter takes place in:

A the balanced modulator stage
B the carrier decouple stage
C the mechanical filter
D the frequency multiplier stage

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

Transmission with SSB, as compared to conventional AM transmission, results in:

A 6 dB gain in the transmitter and 3 dB gain in the receiver
B 6 dB gain in the receiver
C a greater bandpass requirement in the receiver
D 3 dB gain in the transmitter

A-005-004-005 **(D)**

The peak power output of a single-sideband transmitter, when being tested by a two-tone generator is:

A equal to the RF peak output power of any of the tones
B one-half of the RF peak output power of any of the tones
C one-quarter of the RF peak output power of any of the tones
D twice the RF power output of any of the tones

A-005-004-006 **(C)**

What kind of input signal is used to test the amplitude linearity of a single-sideband phone transmitter while viewing the output on an oscilloscope?

A An audio-frequency square wave
B Normal speech
C Two audio-frequency sine waves
D An audio-frequency sine wave

A-005-004-007 **(D)**

When testing the amplitude linearity of a single-sideband transmitter what audio tones are fed into the microphone input and on what kind of kind of instrument is the output observed?

A Two harmonically related tones are fed in, and the output is observed on an oscilloscope
B Two harmonically related tones are fed in, and the output is observed on a distortion analyzer
C Two non-harmonically related tones are fed in, and the output is observed on a distortion analyzer
D Two non-harmonically related tones are fed in, and the output is observed on an oscilloscope

A-005-004-008 **(B)**

What audio frequencies are used in a two-tone test of the linearity of a single-sideband phone transmitter?

A Any two audio tones may be used, but they must be within the transmitter audio passband, and must be harmonically related

B Any two audio tones may be used, but they must be within the transmitter audio passband, and should not be harmonically related

C 20 Hz and 20 kHz tones must be used

D 1200 Hz and 2400 Hz tones must be used

A-005-004-009 **(D)**

What measurement can be made of a single-sideband phone transmitter's amplifier by performing a two-tone test using an oscilloscope?

A Its frequency deviation

B Its percent of carrier phase shift

C Its percent of frequency modulation

D Its linearity

A-005-004-010 **(B)**

How much is the carrier suppressed below peak output power in a single-sideband phone transmission?

A At least 60 dB

B At least 40 dB

C No more than 20 dB

D No more than 30 dB

A-005-004-011 **(A)**

What is meant by "flat topping" in a single-sideband phone transmission?

A Signal distortion caused by excessive drive

B Signal distortion caused by insufficient collector current

C The transmitter's automatic level control is properly adjusted

D The transmitter's carrier is properly suppressed

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

In an FM phone signal having a maximum frequency deviation of 3000 Hz either side of the carrier frequency, what is the modulation index, when the modulating frequency is 1000 Hz?

A 0.3

B 3000

C 1000

D 3

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

What is the modulation index of an FM phone transmitter producing an instantaneous carrier deviation of 6 kHz when modulated with a 2 kHz modulating frequency?

A 3

B 0.333

C 2000

D 6000

A-005-005-003 **(D)**

What is the deviation ratio of an FM phone transmitter having a maximum frequency swing of plus or minus 5 kHz and accepting a maximum modulation rate of 3 kHz?

A 60

B 0.16

C 0.6

D 1.66

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

What is the deviation ratio of an FM phone transmitter having a maximum frequency swing of plus or minus 7.5 kHz and accepting a maximum modulation rate of 3.5 kHz?

A 0.214

B 2.14

C 0.47

D 47

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

When the transmitter is not modulated, or the amplitude of the modulating signal is zero, the frequency of the carrier is called its:

A frequency deviation
B frequency shift
C modulating frequency
D centre frequency

A-005-005-006 **(C)**

In an FM transmitter system, the amount of deviation from the centre frequency is determined solely by the:

A amplitude and the frequency of the modulating frequency
B modulating frequency and the amplitude of the centre frequency
C amplitude of the modulating frequency
D frequency of the modulating frequency

A-005-005-007 **(C)**

Any FM wave with single-tone modulation has:

A four sideband frequencies
B one sideband frequency
C an infinite number of sideband frequencies
D two sideband frequencies

A-005-005-008 **(A)**

Some types of deviation meters work on the principle of:

A a carrier null and multiplying the modulation frequency by the modulation index
B detecting the frequencies in the sidebands
C the amplitude of power in the sidebands
D a carrier peak and dividing by the modulation index

A-005-005-009 **(D)**

When using some deviation meters, it is important to know:

A modulation index
B modulating frequency
C pass-band of the IF filter
D modulating frequency and the modulation index

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

What is the significant bandwidth of an FM-phone transmission having a +/- 5-kHz deviation and a 3-kHz modulating frequency?

A 5 kHz
B 3 kHz
C 16 kHz
D 8 kHz

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

What is the frequency deviation for a 12.21-MHz reactance-modulated oscillator in a +/- 5-kHz deviation, 146.52-MHz FM-phone transmitter?

A +/- 12 kHz
B +/- 5 kHz
C +/- 41.67 Hz
D +/- 416.7 Hz

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

If the signals of two repeater transmitters mix together in one or both of their final amplifiers and unwanted signals at the sum and difference frequencies of the original signals are generated and radiated, what is this called?

A Intermodulation interference
B Neutralization
C Adjacent channel interference
D Amplifier desensitization

A-005-006-002 **(C)**

How does intermodulation interference between two repeater transmitters usually occur?

A When they are in close proximity and the signals cause feedback in one or both of their final amplifiers
B When the signals are reflected out of phase by aircraft passing overhead
C When they are in close proximity and the signals mix in one or both of their final amplifiers
D When the signals are reflected in phase by aircraft passing overhead