SUBELEMENT G6 – CIRCUIT COMPONENTS

[2 Exam Questions – 2 Groups]

G6A – Resistors; capacitors; inductors; rectifiers; solid-state diodes and transistors; vacuum tubes; batteries

G6A01

What is the minimum allowable discharge voltage for maximum life of a standard 12-volt lead-acid battery?

A. 6 volts

B. 8.5 volts

C. 10.5 volts

D. 12 volts

G6A01 (C)

What is the minimum allowable discharge voltage for maximum life of a standard 12-volt lead-acid battery?

A. 6 volts

B. 8.5 volts

C. 10.5 volts

D. 12 volts

G6A02

What is an advantage of batteries with low internal resistance?

A. Long life

B. High discharge current

C. High voltage

D. Rapid recharge

G6A02 (B)

What is an advantage of batteries with low internal resistance?

A. Long life

B. High discharge current

C. High voltage

D. Rapid recharge

G6A03

What is the approximate forward threshold voltage of a germanium diode?

A. 0.1 volt

B. 0.3 volts

C. 0.7 volts

D. 1.0 volts

G6A03 (B)

What is the approximate forward threshold voltage of a germanium diode?

A. 0.1 volt

B. 0.3 volts

C. 0.7 volts

D. 1.0 volts

G6A04

Which of the following is characteristic of an electrolytic capacitor?

A. Tight tolerance

B. Much less leakage than any other type

C. High capacitance for a given volume

D. Inexpensive RF capacitor

G6A04 (C)

Which of the following is characteristic of an electrolytic capacitor?

A. Tight tolerance

B. Much less leakage than any other type

C. High capacitance for a given volume

D. Inexpensive RF capacitor

G6A05

What is the approximate forward threshold voltage of a silicon junction diode?

A. 0.1 volt

B. 0.3 volts

C. 0.7 volts

D. 1.0 volts

G6A05 (C)

What is the approximate forward threshold voltage of a silicon junction diode?

A. 0.1 volt

B. 0.3 volts

C. 0.7 volts

D. 1.0 volts

G6A06

Why should wire-wound resistors not be used in RF circuits?

A. The resistor’s tolerance value would not be adequate

B. The resistor’s inductance could make circuit performance unpredictable

C. The resistor could overheat

D. The resistor’s internal capacitance would detune the circuit

G6A06 (B)

Why should wire-wound resistors not be used in RF circuits?

A. The resistor's tolerance value would not be adequate

B. The resistor's inductance could make circuit performance unpredictable

C. The resistor could overheat

D. The resistor's internal capacitance would detune the circuit

G6A07

What are the operating points for a bipolar transistor used as a switch?

A. Saturation and cutoff

B. The active region (between cutoff and saturation)

C. Peak and valley current points

D. Enhancement and depletion modes

G6A07 (A)

What are the operating points for a bipolar transistor used as a switch?

A. Saturation and cutoff

B. The active region (between cutoff and saturation)

C. Peak and valley current points

D. Enhancement and depletion modes

G6A08

Which of the following is characteristic of low voltage ceramic capacitors?

A. Tight tolerance

B. High stability

C. High capacitance for given volume

D. Comparatively low cost

G6A08 (D)

Which of the following is characteristic of low voltage ceramic capacitors?

A. Tight tolerance

B. High stability

C. High capacitance for given volume

D. Comparatively low cost

G6A09

Which of the following describes MOSFET construction?

A. The gate is formed by a back-biased junction

B. The gate is separated from the channel by a thin insulating layer

C. The source is separated from the drain by a thin insulating layer

D. The source is formed by depositing metal on silicon

G6A09 (B)

Which of the following describes MOSFET construction?

A. The gate is formed by a back-biased junction

B. The gate is separated from the channel by a thin insulating layer

C. The source is separated from the drain by a thin insulating layer

D. The source is formed by depositing metal on silicon

G6A10

Which element of a vacuum tube regulates the flow of electrons between cathode and plate?

A. Control grid

B. Suppressor grid

C. Screen grid

D. Trigger electrode

G6A10 (A)

Which element of a vacuum tube regulates the flow of electrons between cathode and plate?

A. Control grid

B. Suppressor grid

C. Screen grid

D. Trigger electrode

G6A11

What happens when an inductor is operated above its self-resonant frequency?

A. Its reactance increases

B. Harmonics are generated

C. It becomes capacitive

D. Catastrophic failure is likely

G6A11 (C)

What happens when an inductor is operated above its self-resonant frequency?

A. Its reactance increases

B. Harmonics are generated

C. It becomes capacitive

D. Catastrophic failure is likely

G6A12

What is the primary purpose of a screen grid in a vacuum tube?

A. To reduce grid-to-plate capacitance

B. To increase efficiency

C. To increase the control grid resistance

D. To decrease plate resistance

G6A12 (A)

What is the primary purpose of a screen grid in a vacuum tube?

A. To reduce grid-to-plate capacitance

B. To increase efficiency

C. To increase the control grid resistance

D. To decrease plate resistance

G6B – Analog and digital integrated circuits (ICs); microwave ICs (MMICs); display devices; RF connectors; ferrite cores

G6B01

What determines the performance of a ferrite core at different frequencies?

A. Its conductivity

B. Its thickness

C. The composition, or “mix,” of materials used

D. The ratio of outer diameter to inner diameter

G6B01 (C)

What determines the performance of a ferrite core at different frequencies?

A. Its conductivity

B. Its thickness

C. The composition, or “mix,” of materials used

D. The ratio of outer diameter to inner diameter

G6B02

What is meant by the term MMIC?

A. Multi-Mode Integrated Circuit

B. Monolithic Microwave Integrated Circuit

C. Metal Monolayer Integrated Circuit

D. Mode Modulated Integrated Circuit

G6B02 (B)

What is meant by the term MMIC?

A. Multi-Mode Integrated Circuit

B. Monolithic Microwave Integrated Circuit

C. Metal Monolayer Integrated Circuit

D. Mode Modulated Integrated Circuit

G6B03

Which of the following is an advantage of CMOS integrated circuits compared to TTL integrated circuits?

A. Low power consumption

B. High power handling capability

C. Better suited for RF amplification

D. Better suited for power supply regulation

G6B03 (A)

Which of the following is an advantage of CMOS integrated circuits compared to TTL integrated circuits?

A. Low power consumption

B. High power handling capability

C. Better suited for RF amplification

D. Better suited for power supply regulation

G6B04

What is a typical upper frequency limit for low SWR operation of 50-ohm BNC connectors?

A. 50 MHz

B. 500 MHz

C. 4 GHz

D. 40 GHz

G6B04 (C)

What is a typical upper frequency limit for low SWR operation of 50-ohm BNC connectors?

A. 50 MHz

B. 500 MHz

C. 4 GHz

D. 40 GHz

G6B05

What is an advantage of using a ferrite core toroidal inductor?

A. Large values of inductance may be obtained

B. The magnetic properties of the core may be optimized for a specific range of frequencies

C. Most of the magnetic field is contained in the core

D. All these choices are correct

G6B05 (D)

What is an advantage of using a ferrite core toroidal inductor?

A. Large values of inductance may be obtained

B. The magnetic properties of the core may be optimized for a specific range of frequencies

C. Most of the magnetic field is contained in the core

D. All these choices are correct

G6B06

What kind of device is an integrated circuit operational amplifier?

A. Digital

B. MMIC

C. Programmable Logic

D. Analog

G6B06 (D)

What kind of device is an integrated circuit operational amplifier?

A. Digital

B. MMIC

C. Programmable Logic

D. Analog

G6B07

Which of the following describes a type N connector?

A. A moisture-resistant RF connector useful to 10 GHz

B. A small bayonet connector used for data circuits

C. A low noise figure VHF connector

D. A nickel plated version of the PL-259

G6B07 (A)

Which of the following describes a type N connector?

A. A moisture-resistant RF connector useful to 10 GHz

B. A small bayonet connector used for data circuits

C. A low noise figure VHF connector

D. A nickel plated version of the PL-259

G6B08

How is an LED biased when emitting light?

A. In the tunnel-effect region

B. At the Zener voltage

C. Reverse biased

D. Forward biased

G6B08 (D)

How is an LED biased when emitting light?

A. In the tunnel-effect region

B. At the Zener voltage

C. Reverse biased

D. Forward biased

G6B10

How does a ferrite bead or core reduce common-mode RF current on the shield of a coaxial cable?

A. By creating an impedance in the current’s path

B. It converts common-mode current to differential mode current

C. By creating an out-of-phase current to cancel the common-mode current

D. Ferrites expel magnetic fields

G6B10 (A)

How does a ferrite bead or core reduce common-mode RF current on the shield of a coaxial cable?

A. By creating an impedance in the current's path

B. It converts common-mode current to differential mode current

C. By creating an out-of-phase current to cancel the common-mode current

D. Ferrites expel magnetic fields

G6B11

What is an SMA connector?

A. A type-S to type-M adaptor

B. A small threaded connector suitable for signals up to several GHz

C. A connector designed for serial multiple access signals

D. A type of push-on connector intended for high-voltage applications

G6B11 (B)

What is an SMA connector?

A. A type-S to type-M adaptor

B. A small threaded connector suitable for signals up to several GHz

C. A connector designed for serial multiple access signals

D. A type of push-on connector intended for high-voltage applications

G6B12

Which of these connector types is commonly used for low frequency or dc signal connections to a transceiver?

A. PL-259

B. BNC

C. RCA Phono

D. Type N

G6B12 (C)

Which of these connector types is commonly used for low frequency or dc signal connections to a transceiver?

A. PL-259

B. BNC

C. RCA Phono

D. Type N

SUBELEMENT G7 – PRACTICAL CIRCUITS

[3 Exam Questions – 3 Groups]

G7A – Power supplies; schematic symbols

G7A01

What is the function of a power supply bleeder resistor?

A. It acts as a fuse for excess voltage

B. It discharges the filter capacitors when power is removed

C. It removes shock hazards from the induction coils

D. It eliminates ground loop current

G7A01 (B)

What is the function of a power supply bleeder resistor?

A. It acts as a fuse for excess voltage

B. It discharges the filter capacitors when power is removed

C. It removes shock hazards from the induction coils

D. It eliminates ground loop current

G7A02

Which of the following components are used in a power supply filter network?

A. Diodes

B. Transformers and transducers

C. Capacitors and inductors

D. All these choices are correct

G7A02 (C)

Which of the following components are used in a power supply filter network?

A. Diodes

B. Transformers and transducers

C. Capacitors and inductors

D. All these choices are correct

G7A03

Which type of rectifier circuit uses two diodes and a center-tapped transformer?

A. Full-wave

B. Full-wave bridge

C. Half-wave

D. Synchronous

G7A03 (A)

Which type of rectifier circuit uses two diodes and a center-tapped transformer?

A. Full-wave

B. Full-wave bridge

C. Half-wave

D. Synchronous

G7A04

What is characteristic of a half-wave rectifier in a power supply?

A. Only one diode is required

B. The ripple frequency is twice that of a full-wave rectifier

C. More current can be drawn from the half-wave rectifier

D. The output voltage is two times the peak input voltage

G7A04 (A)

What is characteristic of a half-wave rectifier in a power supply?

A. Only one diode is required

B. The ripple frequency is twice that of a full-wave rectifier

C. More current can be drawn from the half-wave rectifier

D. The output voltage is two times the peak input voltage

G7A05

What portion of the AC cycle is converted to DC by a half-wave rectifier?

A. 90 degrees

B. 180 degrees

C. 270 degrees

D. 360 degrees

G7A05 (B)

What portion of the AC cycle is converted to DC by a half-wave rectifier?

A. 90 degrees

B. 180 degrees

C. 270 degrees

D. 360 degrees

G7A06

What portion of the AC cycle is converted to DC by a full-wave rectifier?

A. 90 degrees

B. 180 degrees

C. 270 degrees

D. 360 degrees

G7A06 (D)

What portion of the AC cycle is converted to DC by a full-wave rectifier?

A. 90 degrees

B. 180 degrees

C. 270 degrees

D. 360 degrees

G7A07

What is the output waveform of an unfiltered full-wave rectifier connected to a resistive load?

A. A series of DC pulses at twice the frequency of the AC input

B. A series of DC pulses at the same frequency as the AC input

C. A sine wave at half the frequency of the AC input

D. A steady DC voltage

G7A07 (A)

What is the output waveform of an unfiltered full-wave rectifier connected to a resistive load?

A. A series of DC pulses at twice the frequency of the AC input

B. A series of DC pulses at the same frequency as the AC input

C. A sine wave at half the frequency of the AC input

D. A steady DC voltage

G7A08

Which of the following is characteristic of a switchmode power supply as compared to a linear power supply?

A. Faster switching time makes higher output voltage possible

B. Fewer circuit components are required

C. High-frequency operation allows the use of smaller components

D. Inherently more stable

G7A08 (C)

Which of the following is characteristic of a switchmode power supply as compared to a linear power supply?

A. Faster switching time makes higher output voltage possible

B. Fewer circuit components are required

C. High-frequency operation allows the use of smaller components

D. Inherently more stable

G7A09

Which symbol in figure transistor?

A. Symbol 2

B. Symbol 5

C. Symbol 1

D. Symbol 4

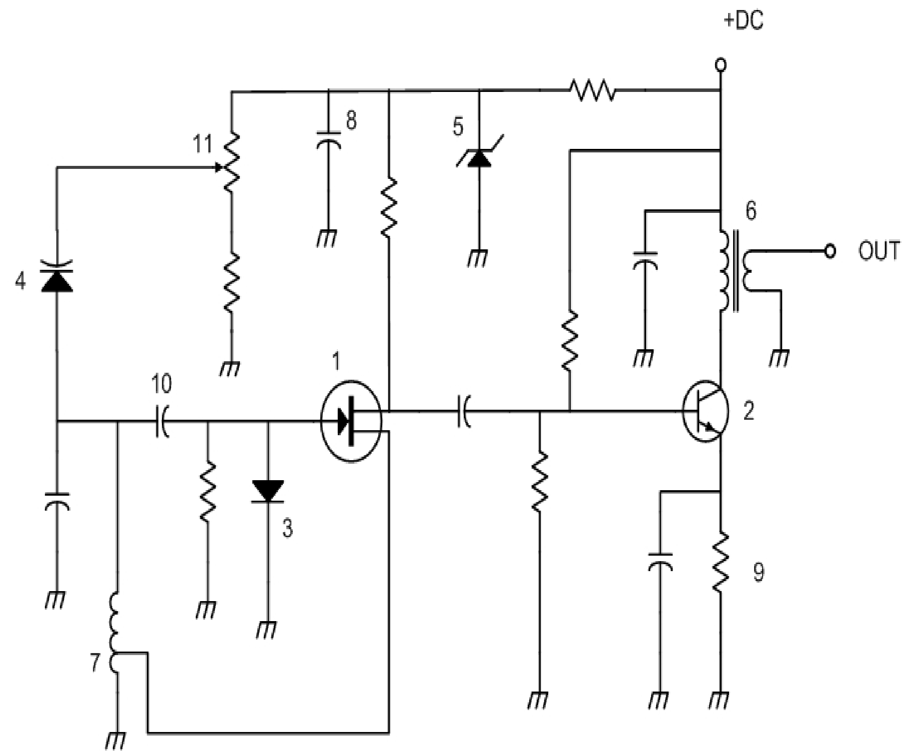

Figure G7-1

G7A09 (C)

Which symbol in figur transistor?

A. Symbol 2

B. Symbol 5

C. Symbol 1

D. Symbol 4

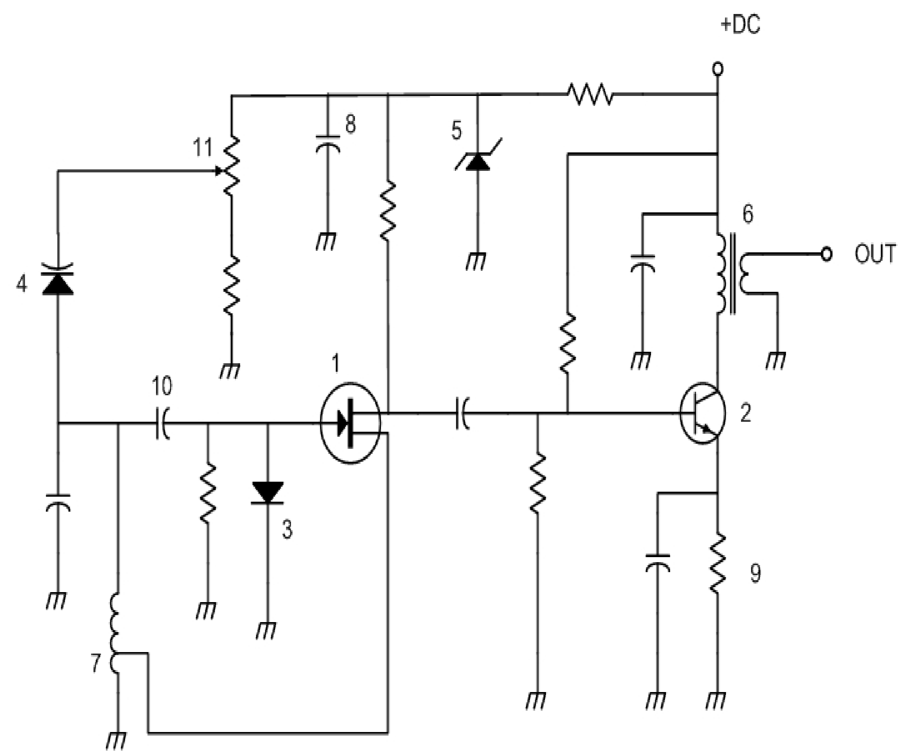

Figure G7-1

G7A10

Which symbol in fig

A. Symbol 4

B. Symbol 1

C. Symbol 11

D. Symbol 5

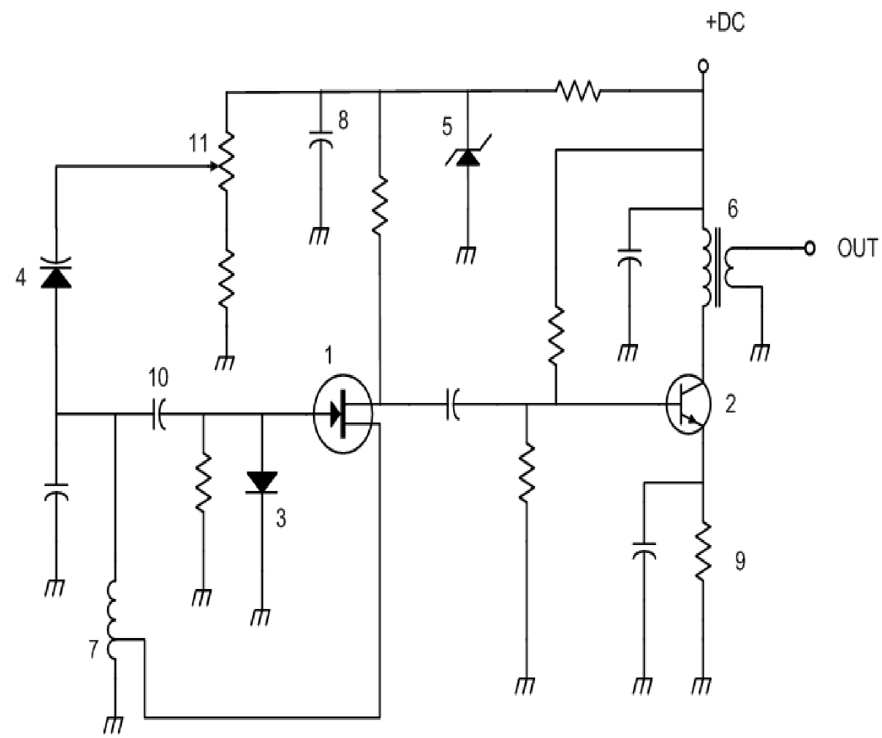

Figure G7-1

G7A10 (D)

Which symbol in figı

A. Symbol 4

B. Symbol 1

C. Symbol 11

D. Symbol 5

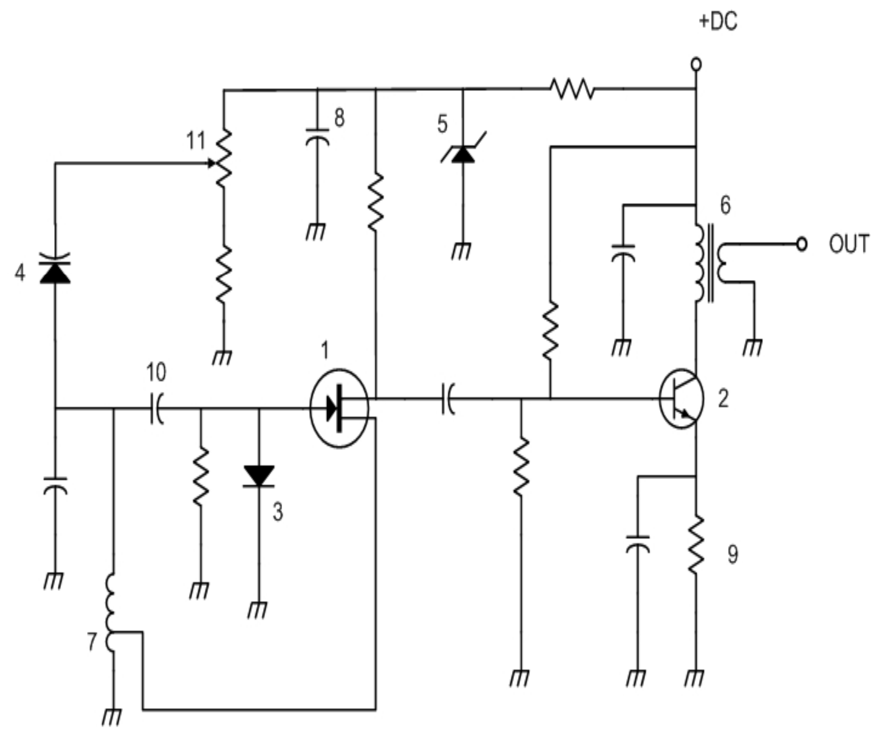

Figure G7-1

G7A11**Which symbol in figure G7-1 represents an NPN junction transistor?**

A. Symbol 1

B. Symbol 2

C. Symbol 7

D. Symbol 11

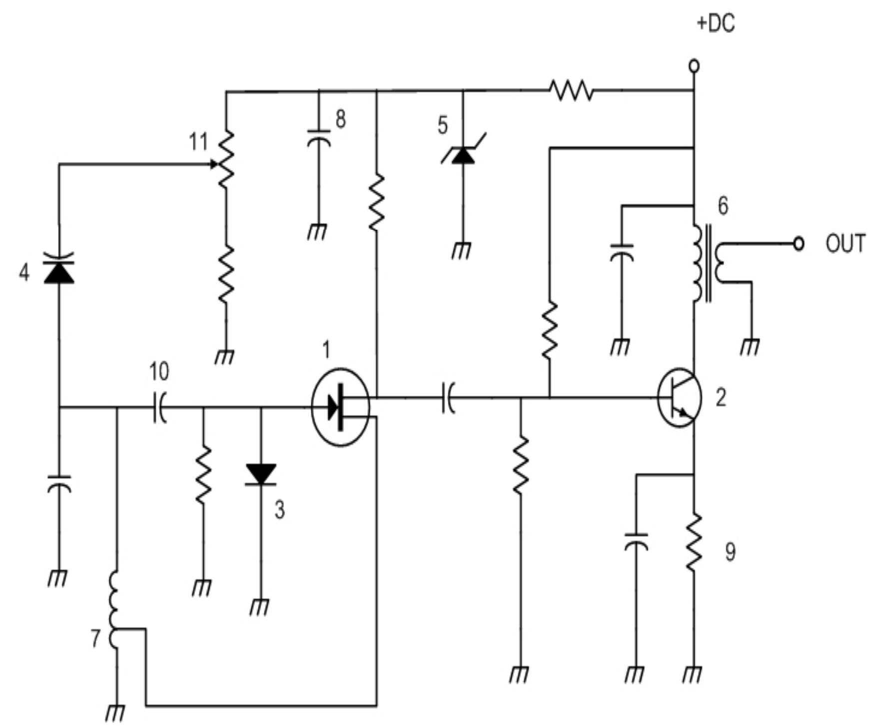

Figure G7-1

G7A11 (B) **Which symbol in figure G7-1 represents an NPN junction transistor?**

A. Symbol 1

B. Symbol 2

C. Symbol 7

D. Symbol 11

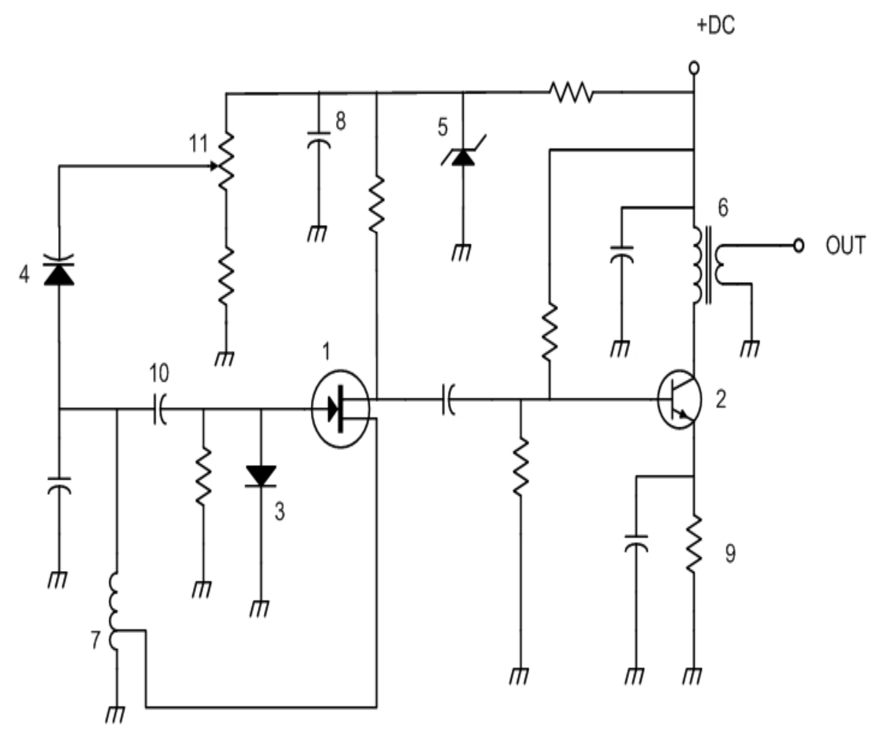

Figure G7-1

G7A12

Which symbol in Figure G7-1 represents a solid core transformer?

A. Symbol 4

B. Symbol 7

C. Symbol 6

D. Symbol 1

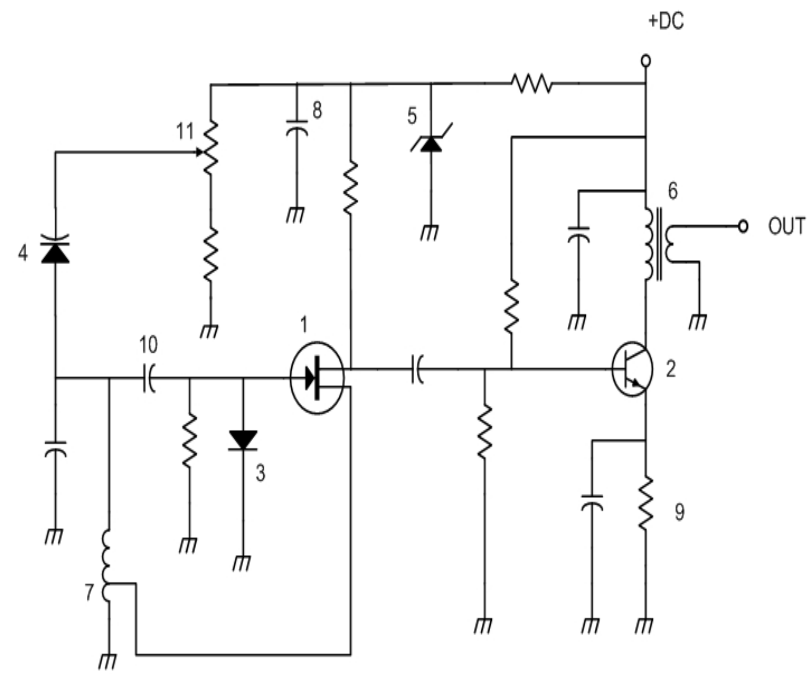

Figure G7-1

G7A12 (C)

Which symbol in Figure G7-1 represents a solid core transformer?

A. Symbol 4

B. Symbol 7

C. Symbol 6

D. Symbol 1

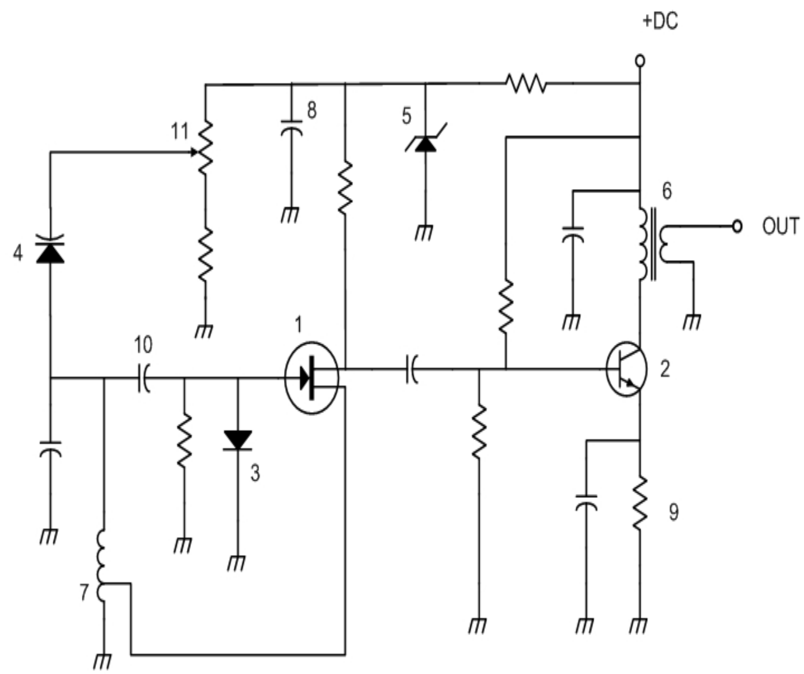

Figure G7-1

G7A13

Which symbol in Figure G7-1 represents a tapped inductor?

A. Symbol 7

B. Symbol 11

C. Symbol 6

D. Symbol 1

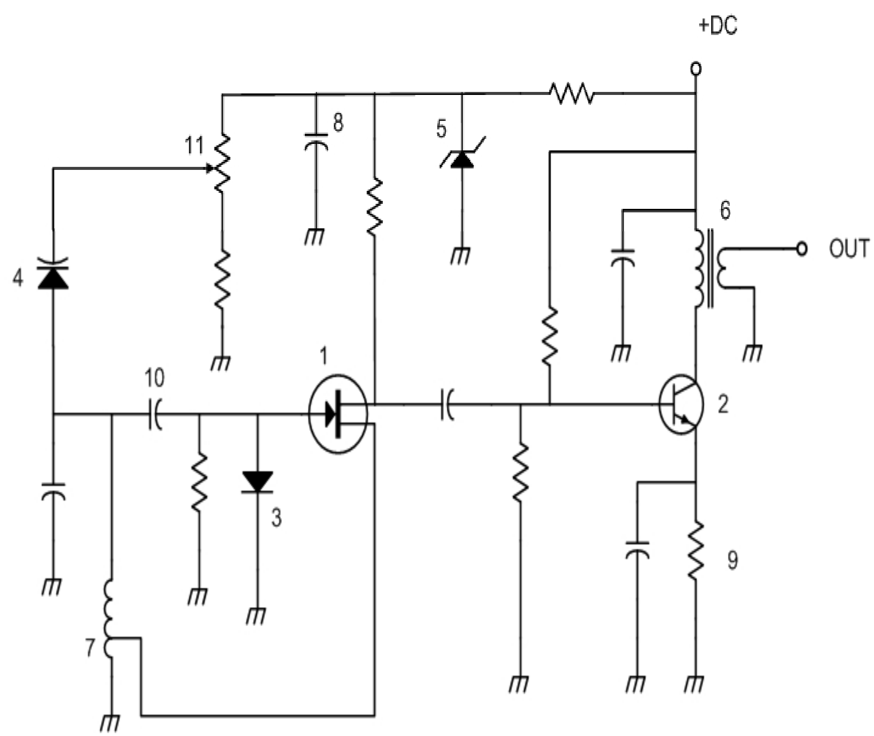

Figure G7-1

G7A13 (A)

Which symbol in Figure G7-1 represents a tapped inductor?

A. Symbol 7

B. Symbol 11

C. Symbol 6

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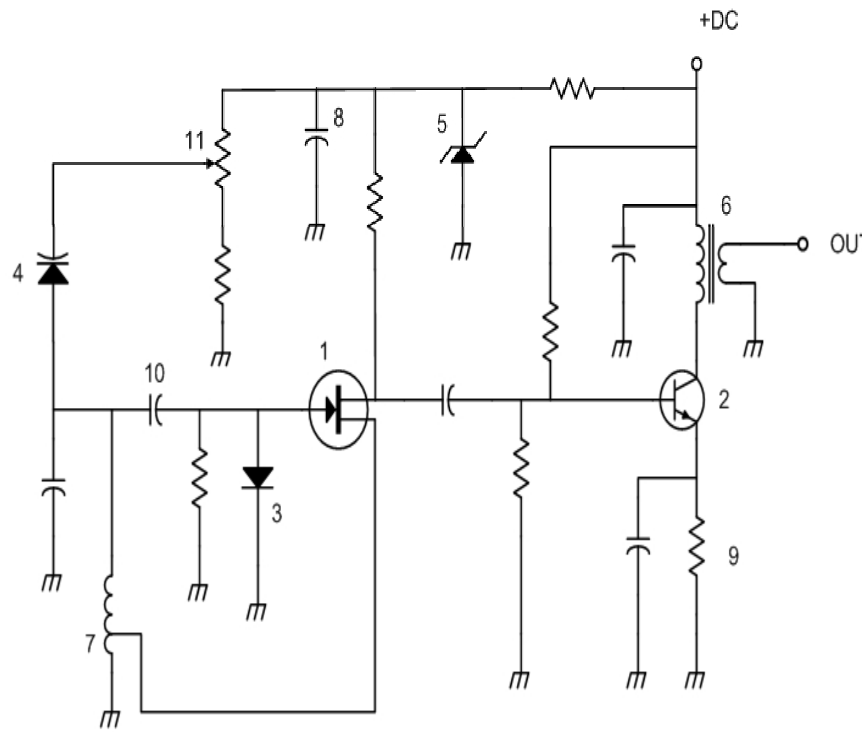

Figure G7-1

G7B – Digital circuits; amplifiers and oscillators

G7B01

What is the purpose of neutralizing an amplifier?

A. To limit the modulation index

B. To eliminate self-oscillations

C. To cut off the final amplifier during standby periods

D. To keep the carrier on frequency

G7B01 (B)

What is the purpose of neutralizing an amplifier?

A. To limit the modulation index

B. To eliminate self-oscillations

C. To cut off the final amplifier during standby periods

D. To keep the carrier on frequency

G7B02

Which of these classes of amplifiers has the highest efficiency?

A. Class A

B. Class B

C. Class AB

D. Class C

G7B02 (D)

Which of these classes of amplifiers has the highest efficiency?

A. Class A

B. Class B

C. Class AB

D. Class C

G7B03

Which of the following describes the function of a two-input AND gate?

A. Output is high when either or both inputs are low

B. Output is high only when both inputs are high

C. Output is low when either or both inputs are high

D. Output is low only when both inputs are high

G7B03 (B)

Which of the following describes the function of a two-input AND gate?

A. Output is high when either or both inputs are low

B. Output is high only when both inputs are high

C. Output is low when either or both inputs are high

D. Output is low only when both inputs are high

G7B04

In a Class A amplifier, what percentage of the time does the amplifying device conduct?

A. 100%

B. More than 50% but less than 100%

C. 50%

D. Less than 50%

G7B04 (A)

In a Class A amplifier, what percentage of the time does the amplifying device conduct?

A. 100%

B. More than 50% but less than 100%

C. 50%

D. Less than 50%

G7B05

How many states does a 3-bit binary counter have?

A. 3

B. 6

C. 8

D. 16

G7B05 (C)

How many states does a 3-bit binary counter have?

A. 3

B. 6

C. 8

D. 16

G7B06
What is a shift register?

A. A clocked array of circuits that passes data in steps along the array

B. An array of operational amplifiers used for tri-state arithmetic operations

C. A digital mixer

D. An analog mixer

G7B06 (A)

What is a shift register?

A. A clocked array of circuits that passes data in steps along the array

B. An array of operational amplifiers used for tri-state arithmetic operations

C. A digital mixer

D. An analog mixer

G7B07

Which of the following are basic components of a sine wave oscillator?

A. An amplifier and a divider

B. A frequency multiplier and a mixer

C. A circulator and a filter operating in a feed-forward loop

D. A filter and an amplifier operating in a feedback loop

G7B07 (D)

Which of the following are basic components of a sine wave oscillator?

A. An amplifier and a divider

B. A frequency multiplier and a mixer

C. A circulator and a filter operating in a feed-forward loop

D. A filter and an amplifier operating in a feedback loop

G7B08

How is the efficiency of an RF power amplifier determined?

A. Divide the DC input power by the DC output power

B. Divide the RF output power by the DC input power

C. Multiply the RF input power by the reciprocal of the RF output power

D. Add the RF input power to the DC output power

G7B08 (B)

How is the efficiency of an RF power amplifier determined?

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B. Divide the RF output power by the DC input power

C. Multiply the RF input power by the reciprocal of the RF output power

D. Add the RF input power to the DC output power

G7B09

What determines the frequency of an LC oscillator?

A. The number of stages in the counter

B. The number of stages in the divider

C. The inductance and capacitance in the tank circuit

D. The time delay of the lag circuit

G7B09 (C)

What determines the frequency of an LC oscillator?

A. The number of stages in the counter

B. The number of stages in the divider

C. The inductance and capacitance in the tank circuit

D. The time delay of the lag circuit

G7B10

Which of the following describes a linear amplifier?

A. Any RF power amplifier used in conjunction with an amateur transceiver

B. An amplifier in which the output preserves the input waveform

C. A Class C high efficiency amplifier

D. An amplifier used as a frequency multiplier

G7B10 (B)

Which of the following describes a linear amplifier?

A. Any RF power amplifier used in conjunction with an amateur transceiver

B. An amplifier in which the output preserves the input waveform

C. A Class C high efficiency amplifier

D. An amplifier used as a frequency multiplier

G7B11

For which of the following modes is a Class C power stage appropriate for amplifying a modulated signal?

A. SSB

B. FM

C. AM

D. All these choices are correct

G7B11 (B)

For which of the following modes is a Class C power stage appropriate for amplifying a modulated signal?

A. SSB

B. FM

C. AM

D. All these choices are correct

G7C – Transceiver design; filters; oscillators; digital signal processing (DSP)

G7C01

What circuit is used to select one of the sidebands from a balanced modulator?

A. Carrier oscillator

B. Filter

C. IF amplifier

D. RF amplifier

G7C01 (B)

What circuit is used to select one of the sidebands from a balanced modulator?

A. Carrier oscillator

B. Filter

C. IF amplifier

D. RF amplifier

G7C02

What output is produced by a balanced modulator?

A. Frequency modulated RF

B. Audio with equalized frequency response

C. Audio extracted from the modulation signal

D. Double-sideband modulated RF

G7C02 (D)

What output is produced by a balanced modulator?

A. Frequency modulated RF

B. Audio with equalized frequency response

C. Audio extracted from the modulation signal

D. Double-sideband modulated RF

G7C03

What is one reason to use an impedance matching transformer at a transmitter output?

A. To minimize transmitter power output

B. To present the desired impedance to the transmitter and feed line

C. To reduce power supply ripple

D. To minimize radiation resistance

G7C03 (B)

What is one reason to use an impedance matching transformer at a transmitter output?

A. To minimize transmitter power output

B. To present the desired impedance to the transmitter and feed line

C. To reduce power supply ripple

D. To minimize radiation resistance

G7C04

How is a product detector used?

A. Used in test gear to detect spurious mixing products

B. Used in transmitter to perform frequency multiplication

C. Used in an FM receiver to filter out unwanted sidebands

D. Used in a single sideband receiver to extract the modulated signal

G7C04 (D)

How is a product detector used?

A. Used in test gear to detect spurious mixing products

B. Used in transmitter to perform frequency multiplication

C. Used in an FM receiver to filter out unwanted sidebands

D. Used in a single sideband receiver to extract the modulated signal

G7C05

Which of the following is characteristic of a direct digital synthesizer (DDS)?

A. Extremely narrow tuning range

B. Relatively high-power output

C. Pure sine wave output

D. Variable output frequency with the stability of a crystal oscillator

G7C05 (D)

Which of the following is characteristic of a direct digital synthesizer (DDS)?

A. Extremely narrow tuning range

B. Relatively high-power output

C. Pure sine wave output

D. Variable output frequency with the stability of a crystal oscillator

G7C06

Which of the following is an advantage of a digital signal processing (DSP) filter compared to an analog filter?

A wide range of filter bandwidths and shapes can be created

B. Fewer digital components are required

C. Mixing products are greatly reduced

D. The DSP filter is much more effective at VHF frequencies

G7C06 (A)

Which of the following is an advantage of a digital signal processing (DSP) filter compared to an analog filter?

A. A wide range of filter bandwidths and shapes can be created

B. Fewer digital components are required

C. Mixing products are greatly reduced

D. The DSP filter is much more effective at VHF frequencies

G7C07

What term specifies a filter's attenuation inside its passband?

A. Insertion loss

B. Return loss

C. Q

D. Ultimate rejection

G7C07 (A)

What term specifies a filter’s attenuation inside its passband?

A. Insertion loss

B. Return loss

C. Q

D. Ultimate rejection

G7C08

Which parameter affects receiver sensitivity?

A. Input amplifier gain

B. Demodulator stage bandwidth

C. Input amplifier noise figure

D. All these choices are correct

G7C08 (D)

Which parameter affects receiver sensitivity?

A. Input amplifier gain

B. Demodulator stage bandwidth

C. Input amplifier noise figure

D. All these choices are correct

G7C09

What is the phase difference between the I and Q RF signals that software-defined radio (SDR) equipment uses for modulation and demodulation?

A. Zero

B. 90 degrees

C. 180 degrees

D. 45 degrees

G7C09 (B)

What is the phase difference between the I and Q RF signals that software-defined radio (SDR) equipment uses for modulation and demodulation?

A. Zero

B. 90 degrees

C. 180 degrees

D. 45 degrees

G7C10

What is an advantage of using I-Q modulation with software-defined radios (SDRs)?

A. The need for high resolution analog-to-digital converters is eliminated

B. All types of modulation can be created with appropriate processing

C. Minimum detectible signal level is reduced

D. Automatic conversion of the signal from digital to analog

G7C10 (B)

What is an advantage of using I-Q modulation with software-defined radios (SDRs)?

A. The need for high resolution analog-to-digital converters is eliminated

B. All types of modulation can be created with appropriate processing

C. Minimum detectible signal level is reduced

D. Automatic conversion of the signal from digital to analog

G7C11

Which of these functions is performed by software in a software-defined radio (SDR)?

A. Filtering

B. Detection

C. Modulation

D. All these choices are correct

G7C11 (D)

Which of these functions is performed by software in a software-defined radio (SDR)?

A. Filtering

B. Detection

C. Modulation

D. All these choices are correct

G7C12

What is the frequency above which a low-pass filter's output power is less than half the input power?

A. Notch frequency

B. Neper frequency

C. Cutoff frequency

D. Rolloff frequency

G7C12 (C)

What is the frequency above which a low-pass filter's output power is less than half the input power?

A. Notch frequency

B. Neper frequency

C. Cutoff frequency

D. Rolloff frequency

G7C13

What term specifies a filter's maximum ability to reject signals outside its passband?

A. Notch depth

B. Rolloff

C. Insertion loss

D. Ultimate rejection

G7C13 (D)

What term specifies a filter's maximum ability to reject signals outside its passband?

A. Notch depth

B. Rolloff

C. Insertion loss

D. Ultimate rejection

SUBELEMENT G8 – SIGNALS AND EMISSIONS

[3 Exam Questions – 3 Groups]

G8A – Carriers and modulation: AM, FM, and single sideband; modulation envelope; digital modulation; overmodulation; link budgets and link margins

G8A01

How is direct binary FSK modulation generated?

A. By keying an FM transmitter with a sub-audible tone

B. By changing an oscillator’s frequency directly with a digital control signal

C. By using a transceiver’s computer data interface protocol to change frequencies

D. By reconfiguring the CW keying input to act as a tone generator

G8A01 (B)
How is direct binary FSK modulation generated?

A. By keying an FM transmitter with a sub-audible tone

B. By changing an oscillator’s frequency directly with a digital control signal

C. By using a transceiver’s computer data interface protocol to change frequencies

D. By reconfiguring the CW keying input to act as a tone generator

G8A02

What is the name of the process that changes the phase angle of an RF signal to convey information?

A. Phase convolution

B. Phase modulation

C. Phase transformation

D. Phase inversion

G8A02 (B)

What is the name of the process that changes the phase angle of an RF signal to convey information?

A. Phase convolution

B. Phase modulation

C. Phase transformation

D. Phase inversion

G8A03

What is the name of the process that changes the instantaneous frequency of an RF wave to convey information?

A. Frequency convolution

B. Frequency transformation

C. Frequency conversion

D. Frequency modulation

G8A03 (D)

What is the name of the process that changes the instantaneous frequency of an RF wave to convey information?

A. Frequency convolution

B. Frequency transformation

C. Frequency conversion

D. Frequency modulation

G8A04

What emission is produced by a reactance modulator connected to a transmitter RF amplifier stage?

A. Multiplex modulation

B. Phase modulation

C. Amplitude modulation

D. Pulse modulation

G8A04 (B)

What emission is produced by a reactance modulator connected to a transmitter RF amplifier stage?

A. Multiplex modulation

B. Phase modulation

C. Amplitude modulation

D. Pulse modulation

G8A05

What type of modulation varies the instantaneous power level of the RF signal?

A. Power modulation

B. Phase modulation

C. Frequency modulation

D. Amplitude modulation

G8A05 (D)

What type of modulation varies the instantaneous power level of the RF signal?

A. Power modulation

B. Phase modulation

C. Frequency modulation

D. Amplitude modulation

G8A06

Which of the following is characteristic of QPSK31?

A. It is sideband sensitive

B. Its encoding provides error correction

C. Its bandwidth is approximately the same as BPSK31

D. All these choices are correct

G8A06 (D)

Which of the following is characteristic of QPSK31?

A. It is sideband sensitive

B. Its encoding provides error correction

C. Its bandwidth is approximately the same as BPSK31

D. All these choices are correct

G8A07

Which of the following phone emissions uses the narrowest bandwidth?

A. Single sideband

B. Vestigial sideband

C. Phase modulation

D. Frequency modulation

G8A07 (A)

Which of the following phone emissions uses the narrowest bandwidth?

A. Single sideband

B. Vestigial sideband

C. Phase modulation

D. Frequency modulation

G8A08

Which of the following is an effect of overmodulation?

A. Insufficient audio

B. Insufficient bandwidth

C. Frequency drift

D. Excessive bandwidth

G8A08 (D)

Which of the following is an effect of overmodulation?

A. Insufficient audio

B. Insufficient bandwidth

C. Frequency drift

D. Excessive bandwidth

G8A09

What type of modulation is used by FT8?

A. 8-tone frequency shift keying

B. Vestigial sideband

C. Amplitude compressed AM

D. 8-bit direct sequence spread spectrum

G8A09 (A)

What type of modulation is used by FT8?

A. 8-tone frequency shift keying

B. Vestigial sideband

C. Amplitude compressed AM

D. 8-bit direct sequence spread spectrum

G8A10

What is meant by the term “flat-topping,” when referring to an amplitude-modulated phone signal?

A. Signal distortion caused by insufficient collector current

B. The transmitter’s automatic level control (ALC) is properly adjusted

C. Signal distortion caused by excessive drive or speech levels

D. The transmitter’s carrier is properly suppressed

G8A10 (C)

What is meant by the term "flat-topping," when referring to an amplitude-modulated phone signal?

A. Signal distortion caused by insufficient collector current

B. The transmitter's automatic level control (ALC) is properly adjusted

C. Signal distortion caused by excessive drive or speech levels

D. The transmitter's carrier is properly suppressed

G8A11

What is the modulation envelope of an AM signal?

A. The waveform created by connecting the peak values of the modulated signal

B. The carrier frequency that contains the signal

C. Spurious signals that envelop nearby frequencies

D. The bandwidth of the modulated signal

G8A11 (A)

What is the modulation envelope of an AM signal?

A. The waveform created by connecting the peak values of the modulated signal

B. The carrier frequency that contains the signal

C. Spurious signals that envelop nearby frequencies

D. The bandwidth of the modulated signal

G8A12

What is QPSK modulation?

A. Modulation using quasi-parallel to serial conversion to reduce bandwidth

B. Modulation using quadra-pole sideband keying to generate spread spectrum signals

C. Modulation using Fast Fourier Transforms to generate frequencies at the first, second, third, and fourth harmonics of the carrier frequency to improve noise immunity

D. Modulation in which digital data is transmitted using 0-, 90-, 180- and 270-degrees phase shift to represent pairs of bits

G8A12 (D)
What is QPSK modulation?

A. Modulation using quasi-parallel to serial conversion to reduce bandwidth

B. Modulation using quadra-pole sideband keying to generate spread spectrum signals

C. Modulation using Fast Fourier Transforms to generate frequencies at the first, second, third, and fourth harmonics of the carrier frequency to improve noise immunity

D. Modulation in which digital data is transmitted using 0-, 90-, 180- and 270-degrees phase shift to represent pairs of bits

G8A13

What is a link budget?

A. The financial costs associated with operating a radio link

B. The sum of antenna gains minus system losses

C. The sum of transmit power and antenna gains minus system losses as seen at the receiver

D. The difference between transmit power and receiver sensitivity

G8A13 (C)

What is a link budget?

A. The financial costs associated with operating a radio link

B. The sum of antenna gains minus system losses

C. The sum of transmit power and antenna gains minus system losses as seen at the receiver

D. The difference between transmit power and receiver sensitivity

G8A14

What is link margin?

A. The opposite of fade margin

B. The difference between received power level and minimum required signal level at the input to the receiver

C. Transmit power minus receiver sensitivity

D. Receiver sensitivity plus 3 dB

G8A14 (B)

What is link margin?

A. The opposite of fade margin

B. The difference between received power level and minimum required signal level at the input to the receiver

C. Transmit power minus receiver sensitivity

D. Receiver sensitivity plus 3 dB

G8B – Frequency changing; bandwidths of various modes; deviation; intermodulation

G8B01

Which mixer input is varied or tuned to convert signals of different frequencies to an intermediate frequency (IF)?

A. Image frequency

B. Local oscillator

C. RF input

D. Beat frequency oscillator

G8B01

Which mixer input is varied or tuned to convert signals of different frequencies to an intermediate frequency (IF)?

A. Image frequency

B. Local oscillator

C. RF input

D. Beat frequency oscillator

G8B02
What is the term for interference from a signal at twice the IF frequency from the desired signal?

A. Quadrature response

B. Image response

C. Mixer interference

D. Intermediate interference

G8B02 (B)
What is the term for interference from a signal at twice the IF frequency from the desired signal?

A. Quadrature response

B. Image response

C. Mixer interference

D. Intermediate interference

G8B03

What is another term for the mixing of two RF signals?

A. Heterodyning

B. Synthesizing

C. Frequency inversion

D. Phase inversion

G8B03 (A)

What is another term for the mixing of two RF signals?

A. Heterodyning

B. Synthesizing

C. Frequency inversion

D. Phase inversion

G8B04

What is the stage in a VHF FM transmitter that generates a harmonic of a lower frequency signal to reach the desired operating frequency?

A. Mixer

B. Reactance modulator

C. Balanced converter

D. Multiplier

G8B04 (D)

What is the stage in a VHF FM transmitter that generates a harmonic of a lower frequency signal to reach the desired operating frequency?

A. Mixer

B. Reactance modulator

C. Balanced converter

D. Multiplier

G8B05

Which intermodulation products are closest to the original signal frequencies?

A. Second harmonics

B. Even-order

C. Odd-order

D. Intercept point

G8B05 (C)

Which intermodulation products are closest to the original signal frequencies?

A. Second harmonics

B. Even-order

C. Odd-order

D. Intercept point

G8B06

What is the total bandwidth of an FM phone transmission having 5 kHz deviation and 3 kHz modulating frequency?

A. 3 kHz

B. 5 kHz

C. 8 kHz

D. 16 kHz

G8B06 (D)

What is the total bandwidth of an FM phone transmission having 5 kHz deviation and 3 kHz modulating frequency?

A. 3 kHz

B. 5 kHz

C. 8 kHz

D. 16 kHz

G8B07

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. 101.75 Hz

B. 416.7 Hz

C. 5 kHz

D. 60 kHz

G8B07 (B)

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. 101.75 Hz

B. 416.7 Hz

C. 5 kHz

D. 60 kHz

G8B08

Why is it important to know the duty cycle of the mode you are using when transmitting?

A. To aid in tuning your transmitter

B. Some modes have high duty cycles that could exceed the transmitter’s average power rating

C. To allow time for the other station to break in during a transmission

D. To prevent overmodulation

G8B08 (B)

Why is it important to know the duty cycle of the mode you are using when transmitting?

A. To aid in tuning your transmitter

B. Some modes have high duty cycles that could exceed the transmitter's average power rating

C. To allow time for the other station to break in during a transmission

D. To prevent overmodulation

G8B09

Why is it good to match receiver bandwidth to the bandwidth of the operating mode?

A. It is required by FCC rules

B. It minimizes power consumption in the receiver

C. It improves impedance matching of the antenna

D. It results in the best signal-to-noise ratio

G8B09 (D)

Why is it good to match receiver bandwidth to the bandwidth of the operating mode?

A. It is required by FCC rules

B. It minimizes power consumption in the receiver

C. It improves impedance matching of the antenna

D. It results in the best signal-to-noise ratio

G8B10

What is the relationship between transmitted symbol rate and bandwidth?

A. Symbol rate and bandwidth are not related

B. Higher symbol rates require wider bandwidth

C. Lower symbol rates require wider bandwidth

D. Bandwidth is half the symbol rate

G8B10 (B)

What is the relationship between transmitted symbol rate and bandwidth?

A. Symbol rate and bandwidth are not related

B. Higher symbol rates require wider bandwidth

C. Lower symbol rates require wider bandwidth

D. Bandwidth is half the symbol rate

G8B11

What combination of a mixer's Local Oscillator (LO) and RF input frequencies is found in the output?

A. The ratio

B. The average

C. The sum and difference

D. The arithmetic product

G8B11 (C)

What combination of a mixer's Local Oscillator (LO) and RF input frequencies is found in the output?

A. The ratio

B. The average

C. The sum and difference

D. The arithmetic product

G8B12

What process combines two signals in a non-linear circuit to produce unwanted spurious outputs?

A. Intermodulation

B. Heterodyning

C. Detection

D. Rolloff

G8B12 (A)

What process combines two signals in a non-linear circuit to produce unwanted spurious outputs?

A. Intermodulation

B. Heterodyning

C. Detection

D. Rolloff

G8B13

Which of the following is an odd-order intermodulation product of frequencies F1 and F2?

A. 5F1-3F2

B. 3F1-F2

C. 2F1-F2

D. All these choices are correct

G8B13 (C)

Which of the following is an odd-order intermodulation product of frequencies F1 and F2?

A. 5F1-3F2

B. 3F1-F2

C. 2F1-F2

D. All these choices are correct

G8C – Digital emission modes

G8C01

On what band do amateurs share channels with the unlicensed Wi-Fi service?

A. 432 MHz

B. 902 MHz

C. 2.4 GHz

D. 10.7 GHz

G8C01 (C)

On what band do amateurs share channels with the unlicensed Wi-Fi service?

A. 432 MHz

B. 902 MHz

C. 2.4 GHz

D. 10.7 GHz

G8C02

Which digital mode is used as a low-power beacon for assessing HF propagation?

A. WSPR

B. MFSK16

C. PSK31

D. SSB-SC

G8C02 (A)

Which digital mode is used as a low-power beacon for assessing HF propagation?

A. WSPR

B. MFSK16

C. PSK31

D. SSB-SC

G8C03

What part of a packet radio frame contains the routing and handling information?

A. Directory

B. Preamble

C. Header

D. Trailer

G8C03 (C)

What part of a packet radio frame contains the routing and handling information?

A. Directory

B. Preamble

C. Header

D. Trailer

G8C04

Which of the following describes Baudot code?

A. A 7-bit code with start, stop, and parity bits

B. A code using error detection and correction

C. A 5-bit code with additional start and stop bits

D. A code using SELCAL and LISTEN

G8C04 (C)

Which of the following describes Baudot code?

A. A 7-bit code with start, stop, and parity bits

B. A code using error detection and correction

C. A 5-bit code with additional start and stop bits

D. A code using SELCAL and LISTEN

G8C05

In an ARQ mode, what is meant by a NAK response to a transmitted packet?

A. Request retransmission of the packet

B. Packet was received without error

C. Receiving station connected and ready for transmissions

D. Entire file received correctly

G8C05 (A)

In an ARQ mode, what is meant by a NAK response to a transmitted packet?

A. Request retransmission of the packet

B. Packet was received without error

C. Receiving station connected and ready for transmissions

D. Entire file received correctly

G8C06

What action results from a failure to exchange information due to excessive transmission attempts when using an ARQ mode?

A. The checksum overflows

B. The connection is dropped

C. Packets will be routed incorrectly

D. Encoding reverts to the default character set

G8C06 (B)

What action results from a failure to exchange information due to excessive transmission attempts when using an ARQ mode?

A. The checksum overflows

B. The connection is dropped

C. Packets will be routed incorrectly

D. Encoding reverts to the default character set

G8C07

Which of the following narrow-band digital modes can receive signals with very low signal-to-noise ratios?

A. MSK144

B. FT8

C. AMTOR

D. MFSK32

G8C07 (B)

Which of the following narrow-band digital modes can receive signals with very low signal-to-noise ratios?

A. MSK144

B. FT8

C. AMTOR

D. MFSK32

G8C08

Which of the following statements is true about PSK31?

A. Upper case letters are sent with more power

B. Upper case letters use longer Varicode bit sequences and thus slow down transmission

C. Error correction is used to ensure accurate message reception

D. Higher power is needed as compared to RTTY for similar error rates

G8C08 (B)
Which of the following statements is true about PSK31?

A. Upper case letters are sent with more power

B. Upper case letters use longer Varicode bit sequences and thus slow down transmission

C. Error correction is used to ensure accurate message reception

D. Higher power is needed as compared to RTTY for similar error rates

G8C09

Which is true of mesh network microwave nodes?

A. Having more nodes increases signal strengths

B. If one node fails, a packet may still reach its target station via an alternate node

C. Links between two nodes in a network may have different frequencies and bandwidths

D. More nodes reduce overall microwave out of band interference

G8C09 (B)

Which is true of mesh network microwave nodes?

A. Having more nodes increases signal strengths

B. If one node fails, a packet may still reach its target station via an alternate node

C. Links between two nodes in a network may have different frequencies and bandwidths

D. More nodes reduce overall microwave out of band interference

G8C10

How does forward error correction (FEC) allow the receiver to correct data errors?

A. By controlling transmitter output power for optimum signal strength

B. By using the Varicode character set

C. By transmitting redundant information with the data

D. By using a parity bit with each character

G8C10 (C)

How does forward error correction (FEC) allow the receiver to correct data errors?

A. By controlling transmitter output power for optimum signal strength

B. By using the Varicode character set

C. By transmitting redundant information with the data

D. By using a parity bit with each character

G8C11

How are the two separate frequencies of a Frequency Shift Keyed (FSK) signal identified?

A. Dot and dash

B. On and off

C. High and low

D. Mark and space

G8C11 (D)

How are the two separate frequencies of a Frequency Shift Keyed (FSK) signal identified?

A. Dot and dash

B. On and off

C. High and low

D. Mark and space

G8C12

Which type of code is used for sending characters in a PSK31 signal?

A. Varicode

B. Viterbi

C. Volumetric

D. Binary

G8C12 (A)

Which type of code is used for sending characters in a PSK31 signal?

A. Varicode

B. Viterbi

C. Volumetric

D. Binary

G8C13

What is indicated on a waterfall display by one or more vertical lines on either side of a data mode or RTTY signal?

A. Long path propagation

B. Backscatter propagation

C. Insufficient modulation

D. Overmodulation

G8C13 (D)

What is indicated on a waterfall display by one or more vertical lines on either side of a data mode or RTTY signal?

A. Long path propagation

B. Backscatter propagation

C. Insufficient modulation

D. Overmodulation

G8C14

Which of the following describes a waterfall display?

A. Frequency is horizontal, signal strength is vertical, time is intensity

B. Frequency is vertical, signal strength is intensity, time is horizontal

C. Frequency is horizontal, signal strength is intensity, time is vertical

D. Frequency is vertical, signal strength is horizontal, time is intensity

G8C14 (C)

Which of the following describes a waterfall display?

A. Frequency is horizontal, signal strength is vertical, time is intensity

B. Frequency is vertical, signal strength is intensity, time is horizontal

C. Frequency is horizontal, signal strength is intensity, time is vertical

D. Frequency is vertical, signal strength is horizontal, time is intensity

SUBELEMENT G9 – ANTENNAS AND FEED LINES

[4 Exam Questions – 4 Groups]

G9A – Feed lines: characteristic impedance and attenuation; standing wave ratio (SWR) calculation, measurement, and effects; antenna feed point matching

G9A01

Which of the following factors determine the characteristic impedance of a parallel conductor feed line?

A. The distance between the centers of the conductors and the radius of the conductors

B. The distance between the centers of the conductors and the length of the line

C. The radius of the conductors and the frequency of the signal

D. The frequency of the signal and the length of the line

G9A01 (A)

Which of the following factors determine the characteristic impedance of a parallel conductor feed line?

A. The distance between the centers of the conductors and the radius of the conductors

B. The distance between the centers of the conductors and the length of the line

C. The radius of the conductors and the frequency of the signal

D. The frequency of the signal and the length of the line

G9A02

What is the relationship between high standing wave ratio (SWR) and transmission line loss?

A. There is no relationship between transmission line loss and SWR

B. High SWR increases loss in a lossy transmission line

C. High SWR makes it difficult to measure transmission line loss

D. High SWR reduces the relative effect of transmission line loss

G9A02 (B)

What is the relationship between high standing wave ratio (SWR) and transmission line loss?

A. There is no relationship between transmission line loss and SWR

B. High SWR increases loss in a lossy transmission line

C. High SWR makes it difficult to measure transmission line loss

D. High SWR reduces the relative effect of transmission line loss

G9A03

What is the nominal characteristic impedance of “window line” transmission line?

A. 50 ohms

B. 75 ohms

C. 100 ohms

D. 450 ohms

G9A03 (D)

What is the nominal characteristic impedance of “window line” transmission line?

A. 50 ohms

B. 75 ohms

C. 100 ohms

D. 450 ohms

G9A04

What causes reflected power at an antenna's feed point?

A. Operating an antenna at its resonant frequency

B. Using more transmitter power than the antenna can handle

C. A difference between feed line impedance and antenna feed point impedance

D. Feeding the antenna with unbalanced feed line

G9A04 (C)

What causes reflected power at an antenna's feed point?

A. Operating an antenna at its resonant frequency

B. Using more transmitter power than the antenna can handle

C. A difference between feed line impedance and antenna feed point impedance

D. Feeding the antenna with unbalanced feed line

G9A05

How does the attenuation of coaxial cable change with increasing frequency?

A. Attenuation is independent of frequency

B. Attenuation increases

C. Attenuation decreases

D. Attenuation follows Marconi’s Law of Attenuation

G9A05 (B)

How does the attenuation of coaxial cable change with increasing frequency?

A. Attenuation is independent of frequency

B. Attenuation increases

C. Attenuation decreases

D. Attenuation follows Marconi’s Law of Attenuation

G9A06

In what units is RF feed line loss usually expressed?

A. Ohms per 1,000 feet

B. Decibels per 1,000 feet

C. Ohms per 100 feet

D. Decibels per 100 feet

G9A06 (D)

In what units is RF feed line loss usually expressed?

A. Ohms per 1,000 feet

B. Decibels per 1,000 feet

C. Ohms per 100 feet

D. Decibels per 100 feet

G9A07

What must be done to prevent standing waves on a feed line connected to an antenna?

A. The antenna feed point must be at DC ground potential

B. The feed line must be an odd number of electrical quarter wavelengths long

C. The feed line must be an even number of physical half wavelengths long

D. The antenna feed point impedance must be matched to the characteristic impedance of the feed line

G9A07 (D)

What must be done to prevent standing waves on a feed line connected to an antenna?

A. The antenna feed point must be at DC ground potential

B. The feed line must be an odd number of electrical quarter wavelengths long

C. The feed line must be an even number of physical half wavelengths long

D. The antenna feed point impedance must be matched to the characteristic impedance of the feed line

G9A08

If the SWR on an antenna feed line is 5:1, and a matching network at the transmitter end of the feed line is adjusted to present a 1:1 SWR to the transmitter, what is the resulting SWR on the feed line?

A. 1:1

B. 5:1

C. Between 1:1 and 5:1 depending on the characteristic impedance of the line

D. Between 1:1 and 5:1 depending on the reflected power at the transmitter

G9A08 (B)

If the SWR on an antenna feed line is 5:1, and a matching network at the transmitter end of the feed line is adjusted to present a 1:1 SWR to the transmitter, what is the resulting SWR on the feed line?

A. 1:1

B. 5:1

C. Between 1:1 and 5:1 depending on the characteristic impedance of the line

D. Between 1:1 and 5:1 depending on the reflected power at the transmitter

G9A09

What standing wave ratio results from connecting a 50-ohm feed line to a 200-ohm resistive load?

A. 4:1

B. 1:4

C. 2:1

D. 1:2

G9A09 (A)

What standing wave ratio results from connecting a 50-ohm feed line to a 200-ohm resistive load?

A. 4:1

B. 1:4

C. 2:1

D. 1:2

G9A10

What standing wave ratio results from connecting a 50-ohm feed line to a 10-ohm resistive load?

A. 2:1

B. 1:2

C. 1:5

D. 5:1

G9A10 (D)

What standing wave ratio results from connecting a 50-ohm feed line to a 10-ohm resistive load?

A. 2:1

B. 1:2

C. 1:5

D. 5:1

G9A11

What is the effect of transmission line loss on SWR measured at the input to the line?

A. Higher loss reduces SWR measured at the input to the line

B. Higher loss increases SWR measured at the input to the line

C. Higher loss increases the accuracy of SWR measured at the input to the line

D. Transmission line loss does not affect the SWR measurement

G9A11 (A)
What is the effect of transmission line loss on SWR measured at the input to the line?

A. Higher loss reduces SWR measured at the input to the line

B. Higher loss increases SWR measured at the input to the line

C. Higher loss increases the accuracy of SWR measured at the input to the line

D. Transmission line loss does not affect the SWR measurement

G9B – Basic dipole and monopole antennas

G9B01

What is a characteristic of a random-wire HF antenna connected directly to the transmitter?

A. It must be longer than 1 wavelength

B. Station equipment may carry significant RF current

C. It produces only vertically polarized radiation

D. It is more effective on the lower HF bands than on the higher bands

G9B01 (B)

What is a characteristic of a random-wire HF antenna connected directly to the transmitter?

A. It must be longer than 1 wavelength

B. Station equipment may carry significant RF current

C. It produces only vertically polarized radiation

D. It is more effective on the lower HF bands than on the higher bands

G9B02

Which of the following is a common way to adjust the feed point impedance of an elevated quarter-wave ground-plane vertical antenna to be approximately 50 ohms?

A. Slope the radials upward

B. Slope the radials downward

C. Lengthen the radials beyond one wavelength

D. Coil the radials

G9B02 (B)

Which of the following is a common way to adjust the feed point impedance of an elevated quarter-wave ground-plane vertical antenna to be approximately 50 ohms?

A. Slope the radials upward

B. Slope the radials downward

C. Lengthen the radials beyond one wavelength

D. Coil the radials

G9B03

Which of the following best describes the radiation pattern of a quarter-wave ground-plane vertical antenna?

A. Bi-directional in azimuth

B. Isotropic

C. Hemispherical

D. Omnidirectional in azimuth

G9B03 (D)

Which of the following best describes the radiation pattern of a quarter-wave ground-plane vertical antenna?

A. Bi-directional in azimuth

B. Isotropic

C. Hemispherical

D. Omnidirectional in azimuth

G9B04

What is the radiation pattern of a dipole antenna in free space in a plane containing the conductor?

A. It is a figure-eight at right angles to the antenna

B. It is a figure-eight off both ends of the antenna

C. It is a circle (equal radiation in all directions)

D. It has a pair of lobes on one side of the antenna and a single lobe on the other side

G9B04 (A)

What is the radiation pattern of a dipole antenna in free space in a plane containing the conductor?

A. It is a figure-eight at right angles to the antenna

B. It is a figure-eight off both ends of the antenna

C. It is a circle (equal radiation in all directions)

D. It has a pair of lobes on one side of the antenna and a single lobe on the other side

G9B05

How does antenna height affect the azimuthal radiation pattern of a horizontal dipole HF antenna at elevation angles higher than about 45 degree?

A. If the antenna is too high, the pattern becomes unpredictable

B. Antenna height has no effect on the pattern

C. If the antenna is less than 1/2 wavelength high, the azimuthal pattern is almost omnidirectional

D. If the antenna is less than 1/2 wavelength high, radiation off the ends of the wire is eliminated

G9B05 (C)

How does antenna height affect the azimuthal radiation pattern of a horizontal dipole HF antenna at elevation angles higher than about 45 degree?

A. If the antenna is too high, the pattern becomes unpredictable

B. Antenna height has no effect on the pattern

C. If the antenna is less than 1/2 wavelength high, the azimuthal pattern is almost omnidirectional

D. If the antenna is less than 1/2 wavelength high, radiation off the ends of the wire is eliminated

G9B06

Where should the radial wires of a ground-mounted vertical antenna system be placed?

A. As high as possible above the ground

B. Parallel to the antenna element

C. On the surface or buried a few inches below the ground

D. At the center of the antenna

G9B06 (C)

Where should the radial wires of a ground-mounted vertical antenna system be placed?

A. As high as possible above the ground

B. Parallel to the antenna element

C. On the surface or buried a few inches below the ground

D. At the center of the antenna

G9B07

How does the feed point impedance of a horizontal 1/2 wave dipole antenna change as the antenna height is reduced to 1/10 wavelength above ground?

A. It steadily increases

B. It steadily decreases

C. It peaks at about 1/8 wavelength above ground

D. It is unaffected by the height above ground

G9B07 (B)

How does the feed point impedance of a horizontal 1/2 wave dipole antenna change as the antenna height is reduced to 1/10 wavelength above ground?

A. It steadily increases

B. It steadily decreases

C. It peaks at about 1/8 wavelength above ground

D. It is unaffected by the height above ground

G9B08

How does the feed point impedance of a 1/2 wave dipole change as the feed point is moved from the center toward the ends?

A. It steadily increases

B. It steadily decreases

C. It peaks at about 1/8 wavelength from the end

D. It is unaffected by the location of the feed point

G9B08 (A)

How does the feed point impedance of a 1/2 wave dipole change as the feed point is moved from the center toward the ends?

A. It steadily increases

B. It steadily decreases

C. It peaks at about 1/8 wavelength from the end

D. It is unaffected by the location of the feed point

G9B09

Which of the following is an advantage of using a horizontally polarized as compared to a vertically polarized HF antenna?

A. Lower ground losses

B. Lower feed point impedance

C. Shorter radials

D. Lower radiation resistance

G9B09 (A)

Which of the following is an advantage of using a horizontally polarized as compared to a vertically polarized HF antenna?

A. Lower ground losses

B. Lower feed point impedance

C. Shorter radials

D. Lower radiation resistance

G9B10

What is the approximate length for a 1/2 wave dipole antenna cut for 14.250 MHz?

A. 8 feet

B. 16 feet

C. 24 feet

D. 33 feet

G9B10 (D)

What is the approximate length for a 1/2 wave dipole antenna cut for 14.250 MHz?

A. 8 feet

B. 16 feet

C. 24 feet

D. 33 feet

G9B11

What is the approximate length for a 1/2 wave dipole antenna cut for 3.550 MHz?

A. 42 feet

B. 84 feet

C. 132 feet

D. 263 feet

G9B11 (C)

What is the approximate length for a 1/2 wave dipole antenna cut for 3.550 MHz?

A. 42 feet

B. 84 feet

C. 132 feet

D. 263 feet

G9B12

What is the approximate length for a 1/4 wave monopole antenna cut for 28.5 MHz?

A. 8 feet

B. 11 feet

C. 16 feet

D. 21 feet

G9B12 (A)

What is the approximate length for a 1/4 wave monopole antenna cut for 28.5 MHz?

A. 8 feet

B. 11 feet

C. 16 feet

D. 21 feet

G9C – Directional antennas

G9C01

Which of the following would increase the bandwidth of a Yagi antenna?

A. Larger-diameter elements

B. Closer element spacing

C. Loading coils in series with the element

D. Tapered-diameter elements

G9C01 (A)

Which of the following would increase the bandwidth of a Yagi antenna?

A. Larger-diameter elements

B. Closer element spacing

C. Loading coils in series with the element

D. Tapered-diameter elements

G9C02

What is the approximate length of the driven element of a Yagi antenna?

A. 1/4 wavelength

B. 1/2 wavelength

C. 3/4 wavelength

D. 1 wavelength

G9C02 (B)

What is the approximate length of the driven element of a Yagi antenna?

A. 1/4 wavelength

B. 1/2 wavelength

C. 3/4 wavelength

D. 1 wavelength

G9C03

How do the lengths of a three-element Yagi reflector and director compare to that of the driven element?

A. The reflector is longer, and the director is shorter

B. The reflector is shorter, and the director is longer

C. They are all the same length

D. Relative length depends on the frequency of operation

G9C03 (A)

How do the lengths of a three-element Yagi reflector and director compare to that of the driven element?

A. The reflector is longer, and the director is shorter

B. The reflector is shorter, and the director is longer

C. They are all the same length

D. Relative length depends on the frequency of operation

G9C04

How does antenna gain in dBi compare to gain stated in dBd for the same antenna?

A. Gain in dBi is 2.15 dB lower

B. Gain in dBi is 2.15 dB higher

C. Gain in dBd is 1.25 dBd lower

D. Gain in dBd is 1.25 dBd higher

G9C04 (B)

How does antenna gain in dBi compare to gain stated in dBd for the same antenna?

A. Gain in dBi is 2.15 dB lower

B. Gain in dBi is 2.15 dB higher

C. Gain in dBd is 1.25 dBd lower

D. Gain in dBd is 1.25 dBd higher

G9C05

What is the primary effect of increasing boom length and adding directors to a Yagi antenna?

A. Gain increases

B. Beamwidth increases

C. Front-to-back ratio decreases

D. Resonant frequency is lower

G9C05 (A)

What is the primary effect of increasing boom length and adding directors to a Yagi antenna?

A. Gain increases

B. Beamwidth increases

C. Front-to-back ratio decreases

D. Resonant frequency is lower

G9C07

What does “front-to-back ratio” mean in reference to a Yagi antenna?

A. The number of directors versus the number of reflectors

B. The relative position of the driven element with respect to the reflectors and directors

C. The power radiated in the major lobe compared to that in the opposite direction

D. The ratio of forward gain to dipole gain

G9C07 (C)

What does "front-to-back ratio" mean in reference to a Yagi antenna?

A. The number of directors versus the number of reflectors

B. The relative position of the driven element with respect to the reflectors and directors

C. The power radiated in the major lobe compared to that in the opposite direction

D. The ratio of forward gain to dipole gain

G9C08

What is meant by the "main lobe" of a directive antenna?

A. The magnitude of the maximum vertical angle of radiation

B. The point of maximum current in a radiating antenna element

C. The maximum voltage standing wave point on a radiating element

D. The direction of maximum radiated field strength from the antenna

G9C08 (D)

What is meant by the “main lobe” of a directive antenna?

A. The magnitude of the maximum vertical angle of radiation

B. The point of maximum current in a radiating antenna element

C. The maximum voltage standing wave point on a radiating element

D. The direction of maximum radiated field strength from the antenna

G9C09

In free space, How does the gain of two three-element, horizontally polarized Yagi antennas spaced vertically 1/2 wavelength apart typically compare to the gain of a single three-element Yagi?

A. Approximately 1.5 dB higher

B. Approximately 3 dB higher

C. Approximately 6 dB higher

D. Approximately 9 dB higher

G9C09 (B)

In free space, How does the gain of two three-element, horizontally polarized Yagi antennas spaced vertically 1/2 wavelength apart typically compare to the gain of a single three-element Yagi?

A. Approximately 1.5 dB higher

B. Approximately 3 dB higher

C. Approximately 6 dB higher

D. Approximately 9 dB higher

G9C10

Which of the following can be adjusted to optimize forward gain, front-to-back ratio, or SWR bandwidth of a Yagi antenna?

A. The physical length of the boom

B. The number of elements on the boom

C. The spacing of each element along the boom

D. All these choices are correct

G9C10 (D)

Which of the following can be adjusted to optimize forward gain, front-to-back ratio, or SWR bandwidth of a Yagi antenna?

A. The physical length of the boom

B. The number of elements on the boom

C. The spacing of each element along the boom

D. All these choices are correct

G9C11

What is a beta or hairpin match?

A. A shorted transmission line stub placed at the feed point of a Yagi antenna to provide impedance matching

B. A 1/4 wavelength section of 75-ohm coax in series with the feed point of a Yagi to provide impedance matching

C. A series capacitor selected to cancel the inductive reactance of a folded dipole antenna

D. A section of 300-ohm twin-lead transmission line used to match a folded dipole antenna

G9C11 (A)

What is a beta or hairpin match?

A. A shorted transmission line stub placed at the feed point of a Yagi antenna to provide impedance matching

B. A 1/4 wavelength section of 75-ohm coax in series with the feed point of a Yagi to provide impedance matching

C. A series capacitor selected to cancel the inductive reactance of a folded dipole antenna

D. A section of 300-ohm twin-lead transmission line used to match a folded dipole antenna

G9C12

Which of the following is a characteristic of using a gamma match with a Yagi antenna?

A. It does not require the driven element to be insulated from the boom

B. It does not require any inductors or capacitors

C. It is useful for matching multiband antennas

D. All these choices are correct

G9C12 (A)

Which of the following is a characteristic of using a gamma match with a Yagi antenna?

A. It does not require the driven element to be insulated from the boom

B. It does not require any inductors or capacitors

C. It is useful for matching multiband antennas

D. All these choices are correct

G9D – Specialized antenna types and applications

G9D01

Which of the following antenna types will be most effective as a near vertical incidence skywave (NVIS) antenna for short-skip communications on 40 meters during the day?

A. A horizontal dipole placed between 1/10 and 1/4 wavelength above the ground

B. A vertical antenna placed between 1/4 and 1/2 wavelength above the ground

C. horizontal dipole placed at approximately 1/2 wavelength above the ground

D. A vertical dipole placed at approximately 1/2 wavelength above the ground

G9D01 (A)

Which of the following antenna types will be most effective as a near vertical incidence skywave (NVIS) antenna for short-skip communications on 40 meters during the day?

A. A horizontal dipole placed between 1/10 and 1/4 wavelength above the ground

B. A vertical antenna placed between 1/4 and 1/2 wavelength above the ground

C. horizontal dipole placed at approximately 1/2 wavelength above the ground

D. A vertical dipole placed at approximately 1/2 wavelength above the ground

G9D02

What is the feed point impedance of an end-fed half-wave antenna?

A. Very low

B. Approximately 50 ohms

C. Approximately 300 ohms

D. Very high

G9D02 (D)

What is the feed point impedance of an end-fed half-wave antenna?

A. Very low

B. Approximately 50 ohms

C. Approximately 300 ohms

D. Very high

G9D03

In which direction is the maximum radiation from a VHF/UHF "halo" antenna?

A. Broadside to the plane of the halo

B. Opposite the feed point

C. Omnidirectional in the plane of the halo

D. On the same side as the feed point

G9D03 (C)

In which direction is the maximum radiation from a VHF/UHF "halo" antenna?

A. Broadside to the plane of the halo

B. Opposite the feed point

C. Omnidirectional in the plane of the halo

D. On the same side as the feed point

G9D04

What is the primary function of antenna traps?

A. To enable multiband operation

B. To notch spurious frequencies

C. To provide balanced feed point impedance

D. To prevent out-of-band operation

G9D04 (A)

What is the primary function of antenna traps?

A. To enable multiband operation

B. To notch spurious frequencies

C. To provide balanced feed point impedance

D. To prevent out-of-band operation

G9D05

What is an advantage of vertically stacking horizontally polarized Yagi antennas?

A. It allows quick selection of vertical or horizontal polarization

B. It allows simultaneous vertical and horizontal polarization

C. It narrows the main lobe in azimuth

D. It narrows the main lobe in elevation

G9D05 (D)

What is an advantage of vertically stacking horizontally polarized Yagi antennas?

A. It allows quick selection of vertical or horizontal polarization

B. It allows simultaneous vertical and horizontal polarization

C. It narrows the main lobe in azimuth

D. It narrows the main lobe in elevation

G9D06

Which of the following is an advantage of a log-periodic antenna?

A. Wide bandwidth

B. Higher gain per element than a Yagi antenna

C. Harmonic suppression

D. Polarization diversity

G9D06 (A)

Which of the following is an advantage of a log-periodic antenna?

A. Wide bandwidth

B. Higher gain per element than a Yagi antenna

C. Harmonic suppression

D. Polarization diversity

G9D07

Which of the following describes a log-periodic antenna?

A. Element length and spacing vary logarithmically along the boom

B. Impedance varies periodically as a function of frequency

C. Gain varies logarithmically as a function of frequency

D. SWR varies periodically as a function of boom length

G9D07 (A)

Which of the following describes a log-periodic antenna?

A. Element length and spacing vary logarithmically along the boom

B. Impedance varies periodically as a function of frequency

C. Gain varies logarithmically as a function of frequency

D. SWR varies periodically as a function of boom length

G9D08

How does a “screwdriver” mobile antenna adjust its feed point impedance?

A. By varying its body capacitance

B. By varying the base loading inductance

C. By extending and retracting the whip

D. By deploying a capacitance hat

G9D08 (B)

How does a “screwdriver” mobile antenna adjust its feed point impedance?

A. By varying its body capacitance

B. By varying the base loading inductance

C. By extending and retracting the whip

D. By deploying a capacitance hat

G9D09

What is the primary use of a Beverage antenna?

A. Directional receiving for MF and low HF bands

B. Directional transmitting for low HF bands

C. Portable direction finding at higher HF frequencies

D. Portable direction finding at lower HF frequencies

G9D09 (A)

What is the primary use of a Beverage antenna?

A. Directional receiving for MF and low HF bands

B. Directional transmitting for low HF bands

C. Portable direction finding at higher HF frequencies

D. Portable direction finding at lower HF frequencies

G9D10

In which direction or directions does an electrically small loop (less than 1/10 wavelength in circumference) have nulls in its radiation pattern?

A. In the plane of the loop

B. Broadside to the loop

C. Broadside and in the plane of the loop

D. Electrically small loops are omnidirectional

G9D10 (B)

In which direction or directions does an electrically small loop (less than 1/10 wavelength in circumference) have nulls in its radiation pattern?

A. In the plane of the loop

B. Broadside to the loop

C. Broadside and in the plane of the loop

D. Electrically small loops are omnidirectional

G9D11

Which of the following is a disadvantage of multiband antennas?

A. They present low impedance on all design frequencies

B. They must be used with an antenna tuner

C. They must be fed with open wire line

D. They have poor harmonic rejection

G9D11 (D)

Which of the following is a disadvantage of multiband antennas?

A. They present low impedance on all design frequencies

B. They must be used with an antenna tuner

C. They must be fed with open wire line

D. They have poor harmonic rejection

G9D12

What is the common name of a dipole with a single central support?

A. Inverted V

B. Inverted L

C. Sloper

D. Lazy H

G9D12 (A)

What is the common name of a dipole with a single central support?

A. Inverted V

B. Inverted L

C. Sloper

D. Lazy H

SUBELEMENT G0 – ELECTRICAL AND RF SAFETY

[2 Exam Questions – 2 Groups]

G0A – RF safety principles, rules, and guidelines; routine station evaluation

G0A01

What is one way that RF energy can affect human body tissue?

A. It heats body tissue

B. It causes radiation poisoning

C. It causes the blood count to reach a dangerously low level

D. It cools body tissue

G0A01 (A)

What is one way that RF energy can affect human body tissue?

A. It heats body tissue

B. It causes radiation poisoning

C. It causes the blood count to reach a dangerously low level

D. It cools body tissue

G0A02

Which of the following is used to determine RF exposure from a transmitted signal?

A. Its duty cycle

B. Its frequency

C. Its power density

D. All these choices are correct

G0A02 (D)

Which of the following is used to determine RF exposure from a transmitted signal?

A. Its duty cycle

B. Its frequency

C. Its power density

D. All these choices are correct

G0A03 [97.13(c)(1)]

How can you determine that your station complies with FCC RF exposure regulations?

A. By calculation based on FCC OET Bulletin 65

B. By calculation based on computer modeling

C. By measurement of field strength using calibrated equipment

D. All these choices are correct

G0A03 (D) [97.13(c)(1)]

How can you determine that your station complies with FCC RF exposure regulations?

A. By calculation based on FCC OET Bulletin 65

B. By calculation based on computer modeling

C. By measurement of field strength using calibrated equipment

D. All these choices are correct

G0A04

What does “time averaging” mean when evaluating RF radiation exposure?

A. The average amount of power developed by the transmitter over a specific 24-hour period

B. The average time it takes RF radiation to have any long-term effect on the body

C. The total time of the exposure

D. The total RF exposure averaged over a certain period

G0A04 (D)

What does “time averaging” mean when evaluating RF radiation exposure?

A. The average amount of power developed by the transmitter over a specific 24-hour period

B. The average time it takes RF radiation to have any long-term effect on the body

C. The total time of the exposure

D. The total RF exposure averaged over a certain period

G0A05 [97.13(c)(2), 1.1307(b)]

What must you do if an evaluation of your station shows that the RF energy radiated by your station exceeds permissible limits for possible human absorption?

A. Take action to prevent human exposure to the excessive RF fields

B. File an Environmental Impact Statement (EIS-97) with the FCC

C. Secure written permission from your neighbors to operate above the controlled MPE limits

D. All these choices are correct

G0A05 (A) [97.13(c)(2), 1.1307(b)]

What must you do if an evaluation of your station shows that the RF energy radiated by your station exceeds permissible limits for possible human absorption?

A. Take action to prevent human exposure to the excessive RF fields

B. File an Environmental Impact Statement (EIS-97) with the FCC

C. Secure written permission from your neighbors to operate above the controlled MPE limits

D. All these choices are correct

G0A06 [97.13(c)(2), 1.1307(1)(b)(3)(i)]

What must you do if your station fails to meet the FCC RF exposure exemption criteria?

A. Perform an RF Exposure Evaluation in accordance with FCC OET Bulletin 65

B. Contact the FCC for permission to transmit

C. Perform an RF exposure evaluation in accordance with World Meteorological Organization guidelines

D. Use an FCC-approved band-pass filter

G0A06 (A) [97.13(c)(2), 1.1307(1)(b)(3)(i)]

What must you do if your station fails to meet the FCC RF exposure exemption criteria?

A. Perform an RF Exposure Evaluation in accordance with FCC OET Bulletin 65

B. Contact the FCC for permission to transmit

C. Perform an RF exposure evaluation in accordance with World Meteorological Organization guidelines

D. Use an FCC-approved band-pass filter

G0A07

What is the effect of modulation duty cycle on RF exposure?

A. A lower duty cycle permits greater power levels to be transmitted

B. A higher duty cycle permits greater power levels to be transmitted

C. Low duty cycle transmitters are exempt from RF exposure evaluation requirements

D. High duty cycle transmitters are exempt from RF exposure requirements

G0A07 (A)

What is the effect of modulation duty cycle on RF exposure?

A. A lower duty cycle permits greater power levels to be transmitted

B. A higher duty cycle permits greater power levels to be transmitted

C. Low duty cycle transmitters are exempt from RF exposure evaluation requirements

D. High duty cycle transmitters are exempt from RF exposure requirements

G0A08 [97.13(c)(2)]

Which of the following steps must an amateur operator take to ensure compliance with RF safety regulations?

A. Post a copy of FCC Part 97.13 in the station

B. Notify neighbors within a 100-foot radius of the antenna of the existence of the station and power levels

C. Perform a routine RF exposure evaluation and prevent access to any identified high exposure areas

D. All these choices are correct

G0A08 (C) [97.13(c)(2)]

Which of the following steps must an amateur operator take to ensure compliance with RF safety regulations?

A. Post a copy of FCC Part 97.13 in the station

B. Notify neighbors within a 100-foot radius of the antenna of the existence of the station and power levels

C. Perform a routine RF exposure evaluation and prevent access to any identified high exposure areas

D. All these choices are correct

G0A09

What type of instrument can be used to accurately measure an RF field strength?

A. A receiver with digital signal processing (DSP) noise reduction

B. A calibrated field strength meter with a calibrated antenna

C. An SWR meter with a peak-reading function

D. An oscilloscope with a high-stability crystal marker generator

G0A09 (B)

What type of instrument can be used to accurately measure an RF field strength?

A. A receiver with digital signal processing (DSP) noise reduction

B. A calibrated field strength meter with a calibrated antenna

C. An SWR meter with a peak-reading function

D. An oscilloscope with a high-stability crystal marker generator

G0A10

What should be done if evaluation shows that a neighbor might experience more than the allowable limit of RF exposure from the main lobe of a directional antenna?

A. Change to a non-polarized antenna with higher gain

B. Use an antenna with a higher front-to-back ratio

C. Take precautions to ensure that the antenna cannot be pointed in their direction when they are present

D. All these choices are correct

G0A10 (C)

What should be done if evaluation shows that a neighbor might experience more than the allowable limit of RF exposure from the main lobe of a directional antenna?

A. Change to a non-polarized antenna with higher gain

B. Use an antenna with a higher front-to-back ratio

C. Take precautions to ensure that the antenna cannot be pointed in their direction when they are present

D. All these choices are correct

G0A11

What precaution should be taken if you install an indoor transmitting antenna?

A. Locate the antenna close to your operating position to minimize feed-line radiation

B. Position the antenna along the edge of a wall to reduce parasitic radiation

C. Make sure that MPE limits are not exceeded in occupied areas

D. Make sure the antenna is properly shielded

G0A11 (C)

What precaution should be taken if you install an indoor transmitting antenna?

A. Locate the antenna close to your operating position to minimize feed-line radiation

B. Position the antenna along the edge of a wall to reduce parasitic radiation

C. Make sure that MPE limits are not exceeded in occupied areas

D. Make sure the antenna is properly shielded

G0A12 [1.1307(1)(b)(3)(i)(A)]
What stations are subject to the FCC rules on RF exposure?

A. All commercial stations; amateur radio stations are exempt

B. Only stations with antennas lower than one wavelength above the ground

C. Only stations transmitting more than 500 watts PEP

D. All stations with a time-averaged transmission of more than one milliwatt

G0A12 (D) [1.1307(1)(b)(3)(i)(A)]
What stations are subject to the FCC rules on RF exposure?

A. All commercial stations; amateur radio stations are exempt

B. Only stations with antennas lower than one wavelength above the ground

C. Only stations transmitting more than 500 watts PEP

D. All stations with a time-averaged transmission of more than one milliwatt

G0B – Station safety: electrical shock, grounding, fusing, interlocks, and wiring; antenna and tower safety

G0B01

Which wire or wires in a four-conductor 240 VAC circuit should be attached to fuses or circuit breakers?

A. Only the hot wires

B. Only the neutral wire

C. Only the ground wire

D. All wires

G0B01 (A)

Which wire or wires in a four-conductor 240 VAC circuit should be attached to fuses or circuit breakers?

A. Only the hot wires

B. Only the neutral wire

C. Only the ground wire

D. All wires

G0B02

According to the National Electrical Code, what is the minimum wire size that may be used safely for wiring with a 20-ampere circuit breaker?

A. AWG number 20

B. AWG number 16

C. AWG number 12

D. AWG number 8

G0B02 (C)

According to the National Electrical Code, what is the minimum wire size that may be used safely for wiring with a 20-ampere circuit breaker?

A. AWG number 20

B. AWG number 16

C. AWG number 12

D. AWG number 8

G0B03

Which size of fuse or circuit breaker would be appropriate to use with a circuit that uses AWG number 14 wiring?

A. 30 amperes

B. 25 amperes

C. 20 amperes

D. 15 amperes

G0B03 (D)

Which size of fuse or circuit breaker would be appropriate to use with a circuit that uses AWG number 14 wiring?

A. 30 amperes

B. 25 amperes

C. 20 amperes

D. 15 amperes

G0B04

Where should the station's lightning protection ground system be located?

A. As close to the station equipment as possible

B. Outside the building

C. Next to the closest power pole

D. Parallel to the water supply line

G0B04 (B)

Where should the station's lightning protection ground system be located?

A. As close to the station equipment as possible

B. Outside the building

C. Next to the closest power pole

D. Parallel to the water supply line

G0B05

Which of the following conditions will cause a ground fault circuit interrupter (GFCI) to disconnect AC power?

A. Current flowing from one or more of the hot wires to the neutral wire

B. Current flowing from one or more of the hot wires directly to ground

C. Overvoltage on the hot wires

D. All these choices are correct

G0B05 (B)

Which of the following conditions will cause a ground fault circuit interrupter (GFCI) to disconnect AC power?

A. Current flowing from one or more of the hot wires to the neutral wire

B. Current flowing from one or more of the hot wires directly to ground

C. Overvoltage on the hot wires

D. All these choices are correct

G0B06

Which of the following is covered by the National Electrical Code?

A. Acceptable bandwidth limits

B. Acceptable modulation limits

C. Electrical safety of the station

D. RF exposure limits of the human body

G0B06 (C)

Which of the following is covered by the National Electrical Code?

A. Acceptable bandwidth limits

B. Acceptable modulation limits

C. Electrical safety of the station

D. RF exposure limits of the human body

G0B07

Which of these choices should be observed when climbing a tower using a safety harness?

A. Always hold on to the tower with one hand

B. Confirm that the harness is rated for the weight of the climber and that it is within its allowable service life

C. Ensure that all heavy tools are securely fastened to the harness

D. All these choices are correct

G0B07 (B)

Which of these choices should be observed when climbing a tower using a safety harness?

A. Always hold on to the tower with one hand

B. Confirm that the harness is rated for the weight of the climber and that it is within its allowable service life

C. Ensure that all heavy tools are securely fastened to the harness

D. All these choices are correct

G0B08

What should be done before climbing a tower that supports electrically powered devices?

A. Notify the electric company that a person will be working on the tower

B. Make sure all circuits that supply power to the tower are locked out and tagged

C. Unground the base of the tower

D. All these choices are correct

G0B08 (B)

What should be done before climbing a tower that supports electrically powered devices?

A. Notify the electric company that a person will be working on the tower

B. Make sure all circuits that supply power to the tower are locked out and tagged

C. Unground the base of the tower

D. All these choices are correct

G0B09

Which of the following is true of an emergency generator installation?

A. The generator should be operated in a well-ventilated area

B. The generator must be insulated from ground

C. Fuel should be stored near the generator for rapid refueling in case of an emergency

D. All these choices are correct

G0B09 (A)

Which of the following is true of an emergency generator installation?

<u>A. The generator should be operated in a well-ventilated area</u>

B. The generator must be insulated from ground

C. Fuel should be stored near the generator for rapid refueling in case of an emergency

D. All these choices are correct

G0B10

Which of the following is a danger from lead-tin solder?

A. Lead can contaminate food if hands are not washed carefully after handling the solder

B. High voltages can cause lead-tin solder to disintegrate suddenly

C. Tin in the solder can “cold flow,” causing shorts in the circuit

D. RF energy can convert the lead into a poisonous gas

G0B10 (A)

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G0B11

Which of the following is required for lightning protection ground rods?

A. They must be bonded to all buried water and gas lines

B. Bends in ground wires must be made as close as possible to a right angle

C. Lightning grounds must be connected to all ungrounded wiring

D. They must be bonded together with all other grounds

G0B11 (D)

Which of the following is required for lightning protection ground rods?

A. They must be bonded to all buried water and gas lines

B. Bends in ground wires must be made as close as possible to a right angle

C. Lightning grounds must be connected to all ungrounded wiring

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G0B12

What is the purpose of a power supply interlock?

A. To prevent unauthorized changes to the circuit that would void the manufacturer’s warranty

B. To shut down the unit if it becomes too hot

C. To ensure that dangerous voltages are removed if the cabinet is opened

D. To shut off the power supply if too much voltage is produced

G0B12 (C)

What is the purpose of a power supply interlock?

A. To prevent unauthorized changes to the circuit that would void the manufacturer’s warranty

B. To shut down the unit if it becomes too hot

C. To ensure that dangerous voltages are removed if the cabinet is opened

D. To shut off the power supply if too much voltage is produced

G0B13

Where should lightning arrestors be located?

A. Where the feed lines enter the building

B. On the antenna, opposite the feed point

C. In series with each ground lead

D. At the closest power pole ground electrode

G0B13 (A)

Where should lightning arrestors be located?

A. Where the feed lines enter the building

B. On the antenna, opposite the feed point

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This is end the 2023-2027 General Class Question Pool

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