2020-2024 Amateur Extra Class
FCC Element 4 Question Pool
Effective 7/01/2020 – 6/30/2024

SUBELEMENT E9 - ANTENNAS AND TRANSMISSION LINES [8 Exam Questions - 8 Groups]

E9A Basic Antenna parameters: radiation resistance, gain, beamwidth, efficiency; effective radiated power

E9A01
What is an isotropic antenna?
A. A grounded antenna used to measure Earth conductivity
B. A horizontally polarized antenna used to compare Yagi antennas
C. A theoretical, omnidirectional antenna used as a reference for antenna gain
D. A spacecraft antenna used to direct signals toward Earth
~~

E9A02
What is the effective radiated power relative to a dipole of a repeater station with 150 watts transmitter power output, 2 dB feed line loss, 2.2 dB duplexer loss, and 7 dBd antenna gain?
A. 1977 watts
B. 78.7 watts
C. 420 watts
D. 286 watts
~~

E9A03
What is the radiation resistance of an antenna?
A. The combined losses of the antenna elements and feed line
B. The specific impedance of the antenna
C. The value of a resistance that would dissipate the same amount of power as that radiated from an antenna
D. The resistance in the atmosphere that an antenna must overcome to be able to radiate a signal
~~

E9A04
Which of the following factors affect the feed point impedance of an antenna?
A. Transmission line length
B. Antenna height
C. The settings of an antenna tuner at the transmitter
D. The input power level
~~

E9A05
What is included in the total resistance of an antenna system?
A. Radiation resistance plus space impedance
B. Radiation resistance plus transmission resistance
C. Transmission-line resistance plus radiation resistance
D. Radiation resistance plus loss resistance
~~

E9A06

What is the effective radiated power relative to a dipole of a repeater station with 200 watts transmitter power output, 4 dB feed line loss, 3.2 dB duplexer loss, 0.8 dB circulator loss, and 10 dBd antenna gain?

A. 317 watts
B. 2000 watts
C. 126 watts
D. 300 watts
~~

E9A07

What is the effective isotropic radiated power of a repeater station with 200 watts transmitter power output, 2 dB feed line loss, 2.8 dB duplexer loss, 1.2 dB circulator loss, and 7 dBi antenna gain?

A. 159 watts
B. 252 watts
C. 632 watts
D. 63.2 watts
~~

E9A08

What is antenna bandwidth?

A. Antenna length divided by the number of elements
B. The frequency range over which an antenna satisfies a performance requirement
C. The angle between the half-power radiation points
D. The angle formed between two imaginary lines drawn through the element ends
~~

E9A09

What is antenna efficiency?

A. Radiation resistance divided by transmission resistance
B. Radiation resistance divided by total resistance
C. Total resistance divided by radiation resistance
D. Effective radiated power divided by transmitter output
~~

E9A10

Which of the following improves the efficiency of a ground-mounted quarter-wave vertical antenna?

A. Installing a radial system
B. Isolating the coax shield from ground
C. Shortening the radiating element
D. All these choices are correct
~~

E9A11

Which of the following factors determines ground losses for a ground-mounted vertical antenna operating in the 3 MHz to 30 MHz range?

A. The standing wave ratio
B. Distance from the transmitter
C. Soil conductivity
D. Take-off angle
~~

E9A12
How much gain does an antenna have compared to a 1/2-wavelength dipole when it has 6 dB gain over an isotropic antenna?
A. 3.85 dB
B. 6.0 dB
C. 8.15 dB
D. 2.79 dB
~~

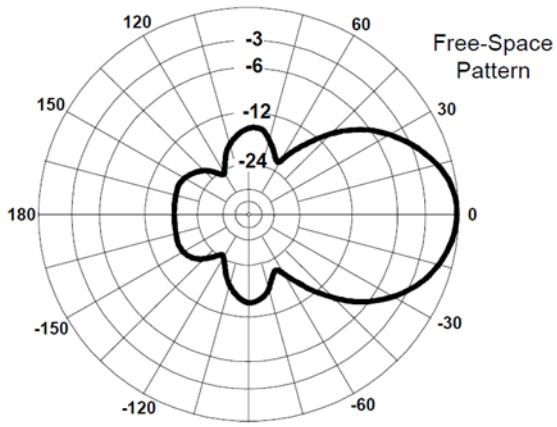
E9A13
What term describes station output, taking into account all gains and losses?
A. Power factor
B. Half-power bandwidth
C. Effective radiated power
D. Apparent power
~~

E9B Antenna patterns and designs: E and H plane patterns; gain as a function of pattern; antenna modeling

E9B01
In the antenna radiation pattern shown in Figure E9-1, what is the beamwidth?
A. 75 degrees
B. 50 degrees
C. 25 degrees
D. 30 degrees
~~

E9B02
In the antenna radiation pattern shown in Figure E9-1, what is the front-to-back ratio?
A. 36 dB
B. 18 dB
C. 24 dB
D. 14 dB
~~

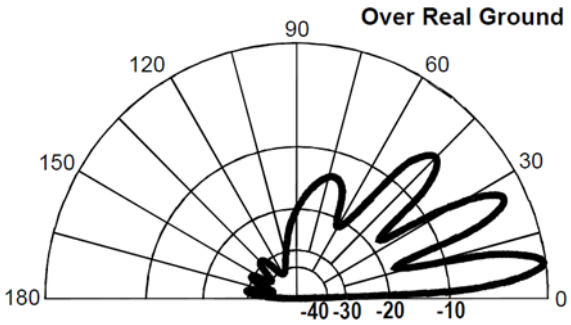
Figure E9-1



E9B03
In the antenna radiation pattern shown in Figure E9-1, what is the front-to-side ratio?
A. 12 dB
B. 14 dB
C. 18 dB
D. 24 dB
~~

E9B04
What is the front-to-back ratio of the radiation pattern shown in Figure E9-2?
A. 15 dB
B. 28 dB
C. 3 dB
D. 38 dB
~~

Figure E9-2



E9B05
What type of antenna pattern is shown in Figure E9-2?
A. Elevation
B. Azimuth
C. Radiation resistance
D. Polarization
~~

E9B06
What is the elevation angle of peak response in the antenna radiation pattern shown in Figure E9-2?
A. 45 degrees
B. 75 degrees
C. 7.5 degrees
D. 25 degrees
~~

E9B07
How does the total amount of radiation emitted by a directional gain antenna compare with the total amount of radiation emitted from a theoretical isotropic antenna, assuming each is driven by the same amount of power?
A. The total amount of radiation from the directional antenna is increased by the gain of the antenna
B. The total amount of radiation from the directional antenna is stronger by its front-to-back ratio
C. They are the same
D. The radiation from the isotropic antenna is 2.15 dB stronger than that from the directional antenna
~~

E9B08
What is the far field of an antenna?
A. The region of the ionosphere where radiated power is not refracted
B. The region where radiated power dissipates over a specified time period
C. The region where radiated field strengths are constant
D. The region where the shape of the antenna pattern is independent of distance
~~

E9B09
What type of computer program technique is commonly used for modeling antennas?
A. Graphical analysis
B. Method of Moments
C. Mutual impedance analysis
D. Calculus differentiation with respect to physical properties
~~

E9B10

What is the principle of a Method of Moments analysis?

A. A wire is modeled as a series of segments, each having a uniform value of current

B. A wire is modeled as a single sine-wave current generator

C. A wire is modeled as a single sine-wave voltage source

D. A wire is modeled as a series of segments, each having a distinct value of voltage across it

~~

E9B11

What is a disadvantage of decreasing the number of wire segments in an antenna model below 10 segments per half-wavelength?

A. Ground conductivity will not be accurately modeled

B. The resulting design will favor radiation of harmonic energy

C. The computed feed point impedance may be incorrect

D. The antenna will become mechanically unstable

~~

E9C Practical wire antennas; folded dipoles; phased arrays; effects of ground near antennas

E9C01

What is the radiation pattern of two 1/4-wavelength vertical antennas spaced 1/2-wavelength apart and fed 180 degrees out of phase?

A. Cardioid

B. Omni-directional

C. A figure-8 broadside to the axis of the array

D. A figure-8 oriented along the axis of the array

~~

E9C02

What is the radiation pattern of two 1/4 wavelength vertical antennas spaced 1/4 wavelength apart and fed 90 degrees out of phase?

A. Cardioid

B. A figure-8 end-fire along the axis of the array

C. A figure-8 broadside to the axis of the array

D. Omni-directional

~~

E9C03

What is the radiation pattern of two 1/4-wavelength vertical antennas spaced 1/2 wavelength apart and fed in phase?

A. Omni-directional

B. Cardioid

C. A Figure-8 broadside to the axis of the array

D. A Figure-8 end-fire along the axis of the array

~~

E9C04

What happens to the radiation pattern of an unterminated long wire antenna as the wire length is increased?

A. The lobes become more perpendicular to the wire

B. The lobes align more in the direction of the wire

C. The vertical angle increases

D. The front-to-back ratio decreases

E9C05
Which of the following is a type of OCFD antenna?
A. A dipole fed approximately 1/3 the way from one end with a 4:1 balun to provide multiband operation
B. A remotely tunable dipole antenna using orthogonally controlled frequency diversity
C. A folded dipole center-fed with 300-ohm transmission line
D. A multiband dipole antenna using one-way circular polarization for frequency diversity
~~

E9C06
What is the effect of adding a terminating resistor to a rhombic antenna?
A. It reflects the standing waves on the antenna elements back to the transmitter
B. It changes the radiation pattern from bidirectional to unidirectional
C. It changes the radiation pattern from horizontal to vertical polarization
D. It decreases the ground loss
~~

E9C07
What is the approximate feed point impedance at the center of a two-wire folded dipole antenna?
A. 300 ohms
B. 72 ohms
C. 50 ohms
D. 450 ohms
~~

E9C08
What is a folded dipole antenna?
A. A dipole one-quarter wavelength long
B. A type of ground-plane antenna
C. A half-wave dipole with an additional parallel wire connecting its two ends
D. A dipole configured to provide forward gain
~~

E9C09
Which of the following describes a G5RV antenna?
A. A multi-band dipole antenna fed with coax and a balun through a selected length of open wire transmission line
B. A multi-band trap antenna
C. A phased array antenna consisting of multiple loops
D. A wide band dipole using shorted coaxial cable for the radiating elements and fed with a 4:1 balun
~~

E9C10
Which of the following describes a Zepp antenna?
A. A dipole constructed from zip cord
B. An end-fed dipole antenna
C. An omni-directional antenna commonly used for satellite communications
D. A vertical array capable of quickly changing the direction of maximum radiation by changing phasing lines
~~

E9C11

How is the far-field elevation pattern of a vertically polarized antenna affected by being mounted over seawater versus soil?

A. The low-angle radiation decreases
B. Additional higher vertical angle lobes will appear
C. Fewer vertical angle lobes will be present
D. The low-angle radiation increases
~~

E9C12

Which of the following describes an Extended Double Zepp antenna?

A. A wideband vertical antenna constructed from precisely tapered aluminum tubing
B. A portable antenna erected using two push support poles
C. A center-fed 1.25-wavelength antenna (two 5/8-wave elements in phase)
D. An end-fed folded dipole antenna
~~

E9C13

How does the radiation pattern of a horizontally polarized 3-element beam antenna vary with increasing height above ground?

A. The takeoff angle of the lowest elevation lobe increases
B. The takeoff angle of the lowest elevation lobe decreases
C. The horizontal beamwidth increases
D. The horizontal beamwidth decreases
~~

E9C14

How does the performance of a horizontally polarized antenna mounted on the side of a hill compare with the same antenna mounted on flat ground?

A. The main lobe takeoff angle increases in the downhill direction
B. The main lobe takeoff angle decreases in the downhill direction
C. The horizontal beamwidth decreases in the downhill direction
D. The horizontal beamwidth increases in the uphill direction
~~

E9D Yagi antennas; parabolic reflectors; circular polarization; loading coils; top loading; feed point impedance of electrically short antennas; antenna Q; RF grounding

E9D01

How much does the gain of an ideal parabolic dish antenna change when the operating frequency is doubled?

A. 2 dB
B. 3 dB
C. 4 dB
D. 6 dB
~~

E9D02

How can linearly polarized Yagi antennas be used to produce circular polarization?

A. Stack two Yagis fed 90 degrees out of phase to form an array with the respective elements in parallel planes
B. Stack two Yagis fed in phase to form an array with the respective elements in parallel planes
C. Arrange two Yagis perpendicular to each other with the driven elements at the same point on the boom fed 90 degrees out of phase
D. Arrange two Yagis collinear to each other with the driven elements fed 180 degrees out of phase
~~

E9D03

Where should a high Q loading coil be placed to minimize losses in a shortened vertical antenna?

A. Near the center of the vertical radiator
B. As low as possible on the vertical radiator
C. As close to the transmitter as possible
D. At a voltage node
~~

E9D04

Why should an HF mobile antenna loading coil have a high ratio of reactance to resistance?

A. To swamp out harmonics
B. To lower the radiation angle
C. To minimize losses
D. To minimize the Q
~~

E9D05

What usually occurs if a Yagi antenna is designed solely for maximum forward gain?

A. The front-to-back ratio increases
B. The front-to-back ratio decreases
C. The frequency response is widened over the whole frequency band
D. The SWR is reduced
~~

E9D06

What happens to the SWR bandwidth when one or more loading coils are used to resonate an electrically short antenna?

A. It is increased
B. It is decreased
C. It is unchanged if the loading coil is located at the feed point
D. It is unchanged if the loading coil is located at a voltage maximum point
~~

E9D07

What is an advantage of using top loading in a shortened HF vertical antenna?

A. Lower Q
B. Greater structural strength
C. Higher losses
D. Improved radiation efficiency
~~

E9D08

What happens as the Q of an antenna increases?

A. SWR bandwidth increases
B. SWR bandwidth decreases
C. Gain is reduced
D. More common-mode current is present on the feed line
~~

E9D09

What is the function of a loading coil used as part of an HF mobile antenna?

A. To increase the SWR bandwidth
B. To lower the losses
C. To lower the Q
D. To cancel capacitive reactance
~~

E9D10

What happens to feed-point impedance at the base of a fixed length HF mobile antenna when operated below its resonant frequency?

A. The radiation resistance decreases and the capacitive reactance decreases
B. The radiation resistance decreases and the capacitive reactance increases
C. The radiation resistance increases and the capacitive reactance decreases
D. The radiation resistance increases and the capacitive reactance increases
~~

E9D11

Which of the following conductors would be best for minimizing losses in a station's RF ground system?

A. Resistive wire, such as spark plug wire
B. Wide flat copper strap
C. Stranded wire
D. Solid wire
~~

E9D12

Which of the following would provide the best RF ground for your station?

A. A 50-ohm resistor connected to ground
B. An electrically short connection to a metal water pipe
C. An electrically short connection to 3 or 4 interconnected ground rods driven into the Earth
D. An electrically short connection to 3 or 4 interconnected ground rods via a series RF choke
~~

E9E Matching: matching antennas to feed lines; phasing lines; power dividers

E9E01

What system matches a higher-impedance transmission line to a lower-impedance antenna by connecting the line to the driven element in two places spaced a fraction of a wavelength each side of element center?

A. The gamma matching system
B. The delta matching system
C. The omega matching system
D. The stub matching system
~~

E9E02
What is the name of an antenna matching system that matches an unbalanced feed line to an antenna by feeding the driven element both at the center of the element and at a fraction of a wavelength to one side of center?
A. The gamma match
B. The delta match
C. The epsilon match
D. The stub match
~~

E9E03
What is the name of the matching system that uses a section of transmission line connected in parallel with the feed line at or near the feed point?
A. The gamma match
B. The delta match
C. The omega match
D. The stub match
~~

E9E04
What is the purpose of the series capacitor in a gamma-type antenna matching network?
A. To provide DC isolation between the feed line and the antenna
B. To cancel the inductive reactance of the matching network
C. To provide a rejection notch that prevents the radiation of harmonics
D. To transform the antenna impedance to a higher value
~~

E9E05
How must an antenna's driven element be tuned to use a hairpin matching system?
A. The driven element reactance must be capacitive
B. The driven element reactance must be inductive
C. The driven element resonance must be lower than the operating frequency
D. The driven element radiation resistance must be higher than the characteristic impedance of the transmission line
~~

E9E06
Which of these feed line impedances would be suitable for constructing a quarter-wave Q-section for matching a 100-ohm loop to 50-ohm feed line?
A. 50 ohms
B. 62 ohms
C. 75 ohms
D. 450 ohms
~~

E9E07
What parameter describes the interactions at the load end of a mismatched transmission line?
A. Characteristic impedance
B. Reflection coefficient
C. Velocity factor
D. Dielectric constant
~~

E9E08
What is a use for a Wilkinson divider?
A. It divides the operating frequency of a transmitter signal so it can be used on a lower frequency band
B. It is used to feed high-impedance antennas from a low-impedance source
C. It is used to divide power equally between two 50-ohm loads while maintaining 50-ohm input impedance
D. It is used to feed low-impedance loads from a high-impedance source
~~

E9E09
Which of the following is used to shunt-feed a grounded tower at its base?
A. Double-bazooka match
B. Hairpin match
C. Gamma match
D. All these choices are correct
~~

E9E10
Which of these choices is an effective way to match an antenna with a 100-ohm feed point impedance to a 50-ohm coaxial cable feed line?
A. Connect a 1/4-wavelength open stub of 300-ohm twinlead in parallel with the coaxial feed line where it connects to the antenna
B. Insert a 1/2 wavelength piece of 300-ohm twinlead in series between the antenna terminals and the 50-ohm feed cable
C. Insert a 1/4-wavelength piece of 75-ohm coaxial cable transmission line in series between the antenna terminals and the 50-ohm feed cable
D. Connect a 1/2 wavelength shorted stub of 75-ohm cable in parallel with the 50-ohm cable where it attaches to the antenna
~~

E9E11
What is the primary purpose of phasing lines when used with an antenna having multiple driven elements?
A. It ensures that each driven element operates in concert with the others to create the desired antenna pattern
B. It prevents reflected power from traveling back down the feed line and causing harmonic radiation from the transmitter
C. It allows single-band antennas to operate on other bands
D. It creates a low-angle radiation pattern
~~

E9F Transmission lines: characteristics of open and shorted feed lines; coax versus open-wire; velocity factor; electrical length; coaxial cable dielectrics

E9F01
What is the velocity factor of a transmission line?
A. The ratio of the characteristic impedance of the line to the terminating impedance
B. The index of shielding for coaxial cable
C. The velocity of the wave in the transmission line multiplied by the velocity of light in a vacuum
D. The velocity of the wave in the transmission line divided by the velocity of light in a vacuum
~~

E9F02
Which of the following has the biggest effect on the velocity factor of a transmission line?
A. The termination impedance
B. The line length
C. Dielectric materials used in the line
D. The center conductor resistivity
~~

E9F03
Why is the physical length of a coaxial cable transmission line shorter than its electrical length?
A. Skin effect is less pronounced in the coaxial cable
B. The characteristic impedance is higher in a parallel feed line
C. The surge impedance is higher in a parallel feed line
D. Electrical signals move more slowly in a coaxial cable than in air
~~

E9F04
What impedance does a 1/2-wavelength transmission line present to a generator when the line is shorted at the far end?
A. Very high impedance
B. Very low impedance
C. The same as the characteristic impedance of the line
D. The same as the output impedance of the generator
~~

E9F05
What is the approximate physical length of a solid polyethylene dielectric coaxial transmission line that is electrically 1/4 wavelength long at 14.1 MHz?
A. 10.6 meters
B. 5.3 meters
C. 4.3 meters
D. 3.5 meters
~~

E9F06
What is the approximate physical length of an air-insulated, parallel conductor transmission line that is electrically 1/2 wavelength long at 14.10 MHz?
A. 7.0 meters
B. 8.5 meters
C. 10.6 meters
D. 13.3 meters
~~

E9F07
How does ladder line compare to small-diameter coaxial cable such as RG-58 at 50 MHz?
A. Lower loss
B. Higher SWR
C. Smaller reflection coefficient
D. Lower velocity factor
~~

E9F08
Which of the following is a significant difference between foam dielectric coaxial cable and solid dielectric cable, assuming all other parameters are the same?
A. Foam dielectric has lower safe operating voltage limits
B. Foam dielectric has lower loss per unit of length
C. Foam dielectric has higher velocity factor
D. All these choices are correct
~~

E9F09
What is the approximate physical length of a foam polyethylene dielectric coaxial transmission line that is electrically 1/4 wavelength long at 7.2 MHz?
A. 10.4 meters
B. 8.3 meters
C. 6.9 meters
D. 5.2 meters
~~

E9F10
What impedance does a 1/8-wavelength transmission line present to a generator when the line is shorted at the far end?
A. A capacitive reactance
B. The same as the characteristic impedance of the line
C. An inductive reactance
D. Zero
~~

E9F11
What impedance does a 1/8-wavelength transmission line present to a generator when the line is open at the far end?
A. The same as the characteristic impedance of the line
B. An inductive reactance
C. A capacitive reactance
D. Infinite
~~

E9F12
What impedance does a 1/4-wavelength transmission line present to a generator when the line is open at the far end?
A. The same as the characteristic impedance of the line
B. The same as the input impedance to the generator
C. Very high impedance
D. Very low impedance
~~

E9F13
What impedance does a 1/4-wavelength transmission line present to a generator when the line is shorted at the far end?
A. Very high impedance
B. Very low impedance
C. The same as the characteristic impedance of the transmission line
D. The same as the generator output impedance
~~

E9G The Smith chart

E9G01
Which of the following can be calculated using a Smith chart?
A. Impedance along transmission lines
B. Radiation resistance
C. Antenna radiation pattern
D. Radio propagation
~~

E9G02
What type of coordinate system is used in a Smith chart?
A. Voltage circles and current arcs
B. Resistance circles and reactance arcs
C. Voltage lines and current chords
D. Resistance lines and reactance chords
~~

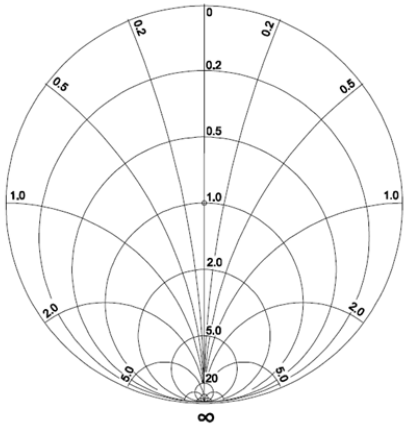
E9G03
Which of the following is often determined using a Smith chart?
A. Beam headings and radiation patterns
B. Satellite azimuth and elevation bearings
C. Impedance and SWR values in transmission lines
D. Trigonometric functions
~~

E9G04
What are the two families of circles and arcs that make up a Smith chart?
A. Resistance and voltage
B. Reactance and voltage
C. Resistance and reactance
D. Voltage and impedance
~~

E9G05
Which of the following is a common use for a Smith chart?
A. Determine the length and position of an impedance matching stub
B. Determine the impedance of a transmission line, given the physical dimensions
C. Determine the gain of an antenna given the physical and electrical parameters
D. Determine the loss/100 feet of a transmission line, given the velocity factor and conductor materials
~~

E9G06
On the Smith chart shown in Figure E9-3, what is the name for the large outer circle on which the reactance arcs terminate?
A. Prime axis
B. Reactance axis
C. Impedance axis
D. Polar axis
~~

Figure E9-3



E9G07
On the Smith chart shown in Figure E9-3, what is the only straight line shown?
A. The reactance axis
B. The current axis
C. The voltage axis
D. The resistance axis
~~

E9G08
What is the process of normalization with regard to a Smith chart?
A. Reassigning resistance values with regard to the reactance axis
B. Reassigning reactance values with regard to the resistance axis
C. Reassigning impedance values with regard to the prime center
D. Reassigning prime center with regard to the reactance axis
~~

E9G09
What third family of circles is often added to a Smith chart during the process of solving problems?
A. Standing wave ratio circles
B. Antenna-length circles
C. Coaxial-length circles
D. Radiation-pattern circles
~~

E9G10
What do the arcs on a Smith chart represent?
A. Frequency
B. SWR
C. Points with constant resistance
D. Points with constant reactance
~~

E9G11
How are the wavelength scales on a Smith chart calibrated?
A. In fractions of transmission line electrical frequency
B. In fractions of transmission line electrical wavelength
C. In fractions of antenna electrical wavelength
D. In fractions of antenna electrical frequency
~~

E9H Receiving Antennas: radio direction finding antennas; Beverage antennas; specialized receiving antennas; long-wire receiving antennas

E9H01
When constructing a Beverage antenna, which of the following factors should be included in the design to achieve good performance at the desired frequency?
A. Its overall length must not exceed 1/4 wavelength
B. It must be mounted more than 1 wavelength above ground
C. It should be configured as a four-sided loop
D. It should be one or more wavelengths long
~~

E9H02

Which is generally true for low band (160 meter and 80 meter) receiving antennas?

A. Atmospheric noise is so high that gain over a dipole is not important
B. They must be erected at least 1/2 wavelength above the ground to attain good directivity
C. Low loss coax transmission line is essential for good performance
D. All these choices are correct
~~

E9H03

What is Receiving Directivity Factor (RDF)?

A. Forward gain compared to the gain in the reverse direction
B. Relative directivity compared to isotropic
C. Relative directivity compared to a dipole
D. Forward gain compared to average gain over the entire hemisphere
~~

E9H04

What is an advantage of placing a grounded electrostatic shield around a small loop direction-finding antenna?

A. It adds capacitive loading, increasing the bandwidth of the antenna
B. It eliminates unbalanced capacitive coupling to the surroundings, improving the nulls
C. It eliminates tracking errors caused by strong out-of-band signals
D. It increases signal strength by providing a better match to the feed line
~~

E9H05

What is the main drawback of a small wire-loop antenna for direction finding?

A. It has a bidirectional pattern
B. It has no clearly defined null
C. It is practical for use only on VHF and higher bands
D. All these choices are correct
~~

E9H06

What is the triangulation method of direction finding?

A. The geometric angles of sky waves from the source are used to determine its position
B. A fixed receiving station plots three headings to the signal source
C. Antenna headings from several different receiving locations are used to locate the signal source
D. A fixed receiving station uses three different antennas to plot the location of the signal source
~~

E9H07

Why is RF attenuation used when direction-finding?

A. To narrow the receiver bandwidth
B. To compensate for isotropic directivity and the antenna effect of feed lines
C. To increase receiver sensitivity
D. To prevent receiver overload which reduces pattern nulls
~~

E9H08

What is the function of a sense antenna?

A. It modifies the pattern of a DF antenna array to provide a null in one direction

B. It increases the sensitivity of a DF antenna array

C. It allows DF antennas to receive signals at different vertical angles

D. It provides diversity reception that cancels multipath signals

~~

E9H09

What is a Pennant antenna?

A. A four-element, high-gain vertical array invented by George Pennant

B. A small, vertically oriented receiving antenna consisting of a triangular loop terminated in approximately 900 ohms

C. A form of rhombic antenna terminated in a variable capacitor to provide frequency diversity

D. A stealth antenna built to look like a flagpole

~~

E9H10

How can the output voltage of a multiple-turn receiving loop antenna be increased?

A. By reducing the permeability of the loop shield

B. By utilizing high impedance wire for the coupling loop

C. By winding adjacent turns in opposing directions

D. By increasing the number of turns and/or the area

~~

E9H11

What feature of a cardioid pattern antenna makes it useful for direction finding?

A. A very sharp peak

B. A very sharp single null

C. Broadband response

D. High radiation angle

~~