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The ARRL Extra Class License Course

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LEVEL 3: Extra

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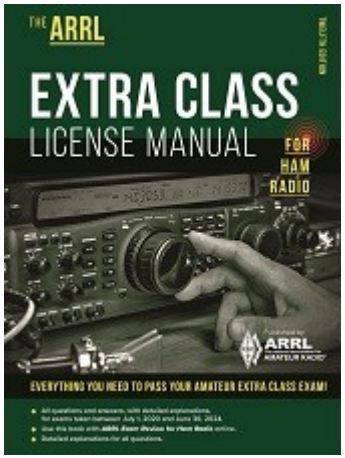

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Which of the following can be calculated using a Smith chart?

A. Impedance along transmission lines

B. Radiation resistance

C. Antenna radiation pattern

D. Radio propagation

E9G01 ECLM Page (9 - 33)

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B. Radiation resistance

C. Antenna radiation pattern

D. Radio propagation

(A) E9G01 ECLM Page (9 - 33)

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

E9G02 ECLM Page (9 - 35)

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

(B) E9G02 ECLM Page (9 - 35)

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

E9G03 ECLM Page (9 - 33)

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

(C) E9G03 ECLM Page (9 - 33)

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

E9G04 ECLM Page (9 - 35)

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

(C) E9G04 ECLM Page (9 - 35)

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

E9G05 ECLM Page (9 - 27)

Which of the following is a common use for a Smith chart?

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D. Determine the loss/100 feet of a transmission line, given the velocity factor and conductor materials

(A) E9G05 ECLM Page (9 - 27)

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

E9G06 ECLM Page (9 - 35)

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

(B) E9G06 ECLM Page (9 - 35)

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

E9G07 ECLM Page (9 - 33)

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

(D) E9G07 ECLM Page (9 - 33)

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

E9G08 ECLM Page (9 - 35)

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

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(C) E9G08 ECLM Page (9 - 35)

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

E9G09 ECLM Page (9 - 35)

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

(A) E9G09 ECLM Page (9 - 35)

What do the arcs on a Smith chart represent?

A. Frequency

B. SWR

C. Points with constant resistance

D. Points with constant reactance

E9G10 ECLM Page (9 - 35)

What do the arcs on a Smith chart represent?

A. Frequency

B. SWR

C. Points with constant resistance

D. Points with constant reactance

(D) E9G10 ECLM Page (9 - 35)

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

E9G11 ECLM Page (9 - 35)

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

(B) E9G11 ECLM Page (9 - 35)

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

E9H01 ECLM Page (9 - 15)

When constructing a Beverage antenna, which of the following factors should be included in the design to achieve good performance at the desired frequency?

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(D) E9H01 ECLM Page (9 - 15)

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

E9H02 ECLM Page (9 - 15)

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

(A) E9H02 ECLM Page (9 - 15)

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

E9H03 ECLM Page (9 - 21)

What is Receiving Directivity Factor (RDF)?

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C. Relative directivity compared to a dipole

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(D) E9H03 ECLM Page (9 - 21)

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

E9H04 ECLM Page (9 - 20)

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

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(B) E9H04 ECLM Page (9 - 20)

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

E9H05 ECLM Page (9 - 20)

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

A. It has a bidirectional pattern

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D. All these choices are correct

(A) E9H05 ECLM Page (9 - 20)

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

E9H06 ECLM Page (9 - 22)

What is the triangulation method of direction finding?

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D. A fixed receiving station uses three different antennas to plot the location of the signal source

(C) E9H06 ECLM Page (9 - 22)

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

E9H07 ECLM Page (9 - 21)

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

(D) E9H07 ECLM Page (9 - 21)

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

E9H08 ECLM Page (9 - 20)

What is the function of a sense antenna?

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

D. It provides diversity reception that cancels multipath signals

(A) E9H08 ECLM Page (9 - 20)

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

E9H09 ECLM Page (9 - 21)

What is a Pennant antenna?

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(B) E9H09 ECLM Page (9 - 21)

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

E9H10 ECLM Page (9 - 21)

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

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(D) E9H10 ECLM Page (9 - 21)

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. Broad band response

D. High-radiation angle

E9H11 ECLM Page (9 - 20)

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

A. A very sharp peak

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(B) E9H11 ECLM Page (9 - 20)