ANNIE G9

SUBELEMENT G9 – ANTENNAS AND FEED LINES [4 Exam Questions – 4 Groups]

G9A - Antenna feed lines: characteristic impedance, and attenuation; SWR calculation, measurement and effects; matching networks

G9A01 (A) Answer in question  
Which of the following factors determine the characteristic impedance of a parallel conductor antenna feed line?

1. The distance between the centers of the conductors and the radius of the conductors
2. The distance between the centers of the conductors and the length of the line
3. The radius of the conductors and the frequency of the signal
4. The frequency of the signal and the length of the line

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G9A02 (B) Always think 50  
What are the typical characteristic impedances of coaxial cables used for antenna feed lines at amateur stations?

1. 25 and 30 ohms
2. 50 and 75 ohms
3. 80 and 100 ohms
4. 500 and 750 ohms

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G9A03 (D) twin or flat feed line is never 50  
What is the characteristic impedance of flat ribbon TV type twinlead?

1. 50 ohms
2. 75 ohms
3. 100 ohms
4. 300 ohms

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Remember in any question about impedance and matching, THE GREATEST ENERGY IS TRANFEED WHEN THE IMPEDANCES MATCH.

G9A04 (C)  
What might cause reflected power at the point where a feed line connects to an antenna?

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  
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G9A05 (B)  
How does the attenuation of coaxial cable change as the frequency of the signal it is carrying increases?

A. Attenuation is independent of frequency  
B. Attenuation increases  
C. Attenuation decreases  
D. Attenuation reaches a maximum at approximately 18 MHz  
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G9A06 (D) LOSS AND GAIN ALWAYS EXPRESSED IN DECIBELS. Always referenced to 100 ft.  
In what units is RF feed line loss usually expressed?

A. Ohms per 1000 feet  
B. Decibels per 1000 feet  
C. Ohms per 100 feet  
D. Decibels per 100 feet  
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G9A07 (D)  
What must be done to prevent standing waves on an antenna feed line?  
A. The antenna feed point must be at DC ground potential  
B. The feed line must be cut to a length equal to an odd number of electrical quarter wavelengths  
C. The feed line must be cut to a length equal to an even number of physical half wavelengths  
D. The antenna feed point impedance must be matched to the characteristic impedance of the feed line ~~

G9A08 (B) SWR IS ALWAYS EXPRESSED AS SOMETHING TO ONE EX 1:1 4:1  
If the SWR on an antenna feed line is 5 to 1, and a matching network at the transmitter end of the feed line is adjusted to 1 to 1 SWR, what is the resulting SWR on the feed line?  
A. 1 to 1  
B. 5 to 1  
C. Between 1 to 1 and 5 to 1 depending on the characteristic impedance of the line  
D. Between 1 to 1 and 5 to 1 depending on the reflected power at the transmitter  
~~

ALWAYS DIVIDE THE LITTLE NUMBER INTO THE LARGE NUMBER. Always expressed X:1

G9A09 (A)  
What standing wave ratio will result when connecting a 50 ohm feed line to a non-reactive load having 200 ohm impedance?  
A. 4:1  
B. 1:4

C. 2:1

D. 1:2

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G9A10 (D)  
What standing wave ratio will result when connecting a 50 ohm feed line to a non-reactive load having 10 ohm impedance?

1. 2:1
2. 50:1
3. 1:5
4. 5:1

~~

G9A11 (B)  
What standing wave ratio will result when connecting a 50 ohm feed line to a non-reactive load having 50 ohm impedance?

1. 2:1
2. 1:1
3. 50:50
4. 0:0

~~

G9A12 (A)  
What standing wave ratio will result when connecting a 50 ohm feed line to a non-reactive load having 25 ohm impedance?

1. 2:1
2. 2.5:1
3. 1.25:1
4. You cannot determine SWR from impedance values

~~

G9A13 (C)  
What standing wave ratio will result when connecting a 50 ohm feed line to an antenna that has a purely resistive 300 ohm feed point impedance?

1. 1.5:1
2. 3:1
3. 6:1
4. You cannot determine SWR from impedance values

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G9A14 (B)  
What is the interaction between high standing wave ratio (SWR) and transmission line loss?

1. There is no interaction between transmission line loss and SWR
2. If a transmission line is lossy, high SWR will increase the loss
3. High SWR makes it difficult to measure transmission line loss
4. High SWR reduces the relative effect of transmission line loss

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G9A15 (A)  
What is the effect of transmission line loss on SWR measured at the input to the line?

1. The higher the transmission line loss, the more the SWR will read artificially low LOSS IS LOW
2. The higher the transmission line loss, the more the SWR will read artificially high
3. The higher the transmission line loss, the more accurate the SWR measurement will be
4. Transmission line loss does not affect the SWR measurement

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G9B - Basic antennas

MOST ALL ANTENNAS ARE BASED ON A ½ WAVE DIPOLE. (DI) MEANS TWO. EACH POLE IS ¼ WAVE

G9B01 (B)  
What is one disadvantage of a directly fed random-wire HF antenna?

1. It must be longer than 1 wavelength
2. You may experience RF burns when touching metal objects in your station

THINK>DIRECTLY FEED YOU GET BURNED

1. It produces only vertically polarized radiation
2. It is more effective on the lower HF bands than on the higher bands

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G9B02 (B)  
Which of the following is a common way to adjust the feed point impedance of a quarter wave ground plane vertical antenna to be approximately 50 ohms?

1. Slope the radials upward
2. Slope the radials downward
3. Lengthen the radials
4. Shorten the radials

~~

G9B03 (B)  
What happens to the feed point impedance of a ground plane antenna when its radials are changed from horizontal to sloping downward?

1. It decreases
2. It increases
3. It stays the same
4. It reaches a maximum at an angle of 45 degrees

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G9B04 (A)  
What is the radiation pattern of a dipole antenna in free space in the plane of the conductor? GOTTA BE RIGHT NOT WRONG

1. It is a figure-eight at right angles to the antenna
2. It is a figure-eight off both ends of the antenna
3. It is a circle (equal radiation in all directions)
4. It has a pair of lobes on one side of the antenna and a single lobe on the other side

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G9B05 (C)

How does antenna height affect the horizontal (azimuthal) radiation pattern of a horizontal dipole HF antenna?

1. If the antenna is too high, the pattern becomes unpredictable
2. Antenna height has no effect on the pattern
3. If the antenna is less than 1/2 wavelength high, the azimuthal pattern is almost omnidirectional
4. If the antenna is less than 1/2 wavelength high, radiation off the ends of the wire is eliminated

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G9B06 (C)  
Where should the radial wires of a ground-mounted vertical antenna system be placed? PICTURE MY VERTICAL ANTENNA

1. As high as possible above the ground
2. Parallel to the antenna element
3. On the surface of the Earth or buried a few inches below the ground
4. At the center of the antenna

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G9B07 (B)  
How does the feed point impedance of a 1/2 wave dipole antenna change as the antenna is lowered below 1/4 wave above ground?

1. It steadily increases
2. It steadily decreases
3. It peaks at about 1/8 wavelength above ground
4. It is unaffected by the height above ground

~~

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? LOWEST IMPEDANCE IS IN THE MIDDLE

1. It steadily increases
2. It steadily decreases
3. It peaks at about 1/8 wavelength from the end
4. It is unaffected by the location of the feed point

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G9B09 (A)  
Which of the following is an advantage of a horizontally polarized as compared to a vertically polarized HF antenna? VERTICAL IS UP. HOROZONTAL IS LOW

1. Lower ground reflection losses
2. Lower feed point impedance
3. Shorter Radials
4. Lower radiation resistance

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* 1. KNOW THE FREQUENCY WAVELENGTH OR BAND
  2. DIVIDE THAT LENGTH INTO TWO FOR ½ WAVELENGTH
  3. REMEMBER A METER IS A LITTLE OVER THREE FEET

G9B10 (D)  
What is the approximate length for a 1/2 wave dipole antenna cut for 14.250 MHz? 20 meter 20 ÷ 2 X 3

A. 8 feet   
B. 16 feet  
C. 24 feet

D. 32 feet

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G9B11 (C)  
What is the approximate length for a 1/2 wave dipole antenna cut for 3.550 MHz? 80 meter

1. 42 feet
2. 84 feet
3. 131 feet
4. 263 feet

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G9B12 (A)  
What is the approximate length for a 1/4 wave vertical antenna cut for 28.5 MHz? 10 meter

1. 8 feet
2. 11 feet
3. 16 feet
4. 21 feet

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REFLECTORS ARE ALWAYS LARGER THAN THE DRIVEN ELEMENT Back of the stage

THE DIRECTOR IS THE LITTLE GUY TELLING YOU WHERE TO GO

G9C - Directional antennas

G9C01 (A)  
Which of the following would increase the bandwidth of a Yagi antenna?

1. Larger diameter elements INCREASE MEANS LARGER
2. Closer element spacing
3. Loading coils in series with the element
4. Tapered-diameter elements

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G9C02 (B) REMEMBER MOST ALL ANTENNAS ARE ½ WAVE LENGTH  
What is the approximate length of the driven element of a Yagi antenna?

1. 1/4 wavelength
2. 1/2 wavelength
3. 3/4 wavelength
4. 1 wavelength

~~

G9C03 (B) WHO IS THE SHORT GUY?  
Which statement about a three-element, single-band Yagi antenna is true? Tape measure antenna

1. The reflector is normally the shortest element
2. The director is normally the shortest element
3. The driven element is the longest element
4. Low feed point impedance increases bandwidth

~~

G9C04 (A)

Which statement about a three-element, single-band Yagi antenna is true?

1. The reflector is normally the longest element
2. The director is normally the longest element
3. The reflector is normally the shortest element
4. All of the elements must be the same length

~~

G9C05 (A) MORE DIRECTORS TELLING YOU WHERE TO GO INCREASES YOUR GAIN  
How does increasing boom length and adding directors affect a Yagi antenna?

1. Gain increases
2. Beam width increases
3. Front to back ratio decreases
4. Front to side ratio decreases

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G9C06 (D) REFLECTORS ARE ALWAYS LARGER  
What configuration of the loops of a two-element quad antenna must be used for the antenna to operate as a beam antenna, assuming one of the elements is used as a reflector?

1. The driven element must be fed with a balun transformer
2. There must be an open circuit in the driven element at the point opposite the feed point
3. The reflector element must be approximately 5 percent shorter than the driven element
4. The reflector element must be approximately 5 percent longer than the driven element

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G9C07 (C) POWER FRONT TO THE POWER BACK  
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 radiation lobe compared to the power radiated in exactly the opposite direction  
D. The ratio of forward gain to dipole gain  
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G9C08 (D)  
What is meant by the "main lobe" of a directive antenna?

1. The magnitude of the maximum vertical angle of radiation
2. The point of maximum current in a radiating antenna element
3. The maximum voltage standing wave point on a radiating element
4. The direction of maximum radiated field strength from the antenna

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G9C09 (B) STACKED ANTENNAS GAIN 3 DB  
How does the gain of two 3-element horizontally polarized Yagi antennas spaced vertically 1/2 wavelength apart typically compare to the gain of a single 3-element Yagi?  
A. Approximately 1.5 dB higher  
B. Approximately 3 dB higher  
C. Approximately 6 dB higher

D. Approximately 9 dB higher

~~

G9C10 (D)  
Which of the following is a Yagi antenna design variable that could be adjusted to optimize forward gain, front- to-back ratio, or SWR bandwidth?

1. The physical length of the boom
2. The number of elements on the boom
3. The spacing of each element along the boom
4. All of these choices are correct

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G9C11 (A)  
What is the purpose of a gamma match used with Yagi antennas?

1. To match the relatively low feed point impedance to 50 ohms
2. To match the relatively high feed point impedance to 50 ohms
3. To increase the front-to-back ratio
4. To increase the main lobe gain

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G9C12 (A)  
Which of the following is an advantage of using a gamma match for impedance matching of a Yagi antenna to 50 ohm coax feed line?

1. It does not require that the elements be insulated from the boom
2. It does not require any inductors or capacitors
3. It is useful for matching multiband antennas
4. All of these choices are correct

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G9C13 (A)  
Approximately how long is each side of the driven element of a quad antenna?

1. 1/4 wavelength
2. 1/2 wavelength
3. 3/4 wavelength
4. 1 wavelength

~~

G9C14 (B)  
How does the forward gain of a two-element quad antenna compare to the forward gain of a three-element Yagi antenna?

1. About 2/3 as much
2. About the same
3. About 1.5 times as much
4. About twice as much

~~

G9C15 (B) EACH SIDE IS A QUARTER WAVE REFLECTOR ALWAYS A LITTLE LARGER  
Approximately how long is each side of the reflector element of a quad antenna?

1. Slightly less than 1/4 wavelength
2. Slightly more than 1/4 wavelength
3. Slightly less than 1/2 wavelength
4. Slightly more than 1/2 wavelength

~~

G9C16 (D)  
How does the gain of a two-element delta-loop beam compare to the gain of a two-element quad antenna?

1. 3 dB higher
2. 3 dB lower
3. 2.54 dB higher
4. About the same

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G9C17 (B) DELTA HAS THREE SIDES  
Approximately how long is each leg of a symmetrical delta-loop antenna?

1. 1/4 wavelength
2. 1/3 wavelength
3. 1/2 wavelength
4. 2/3 wavelength

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G9C18 (A)  
What happens when the feed point of a quad antenna of any shape is moved from the midpoint of the top or bottom to the midpoint of either side?

1. The polarization of the radiated signal changes from horizontal to vertical
2. The polarization of the radiated signal changes from vertical to horizontal
3. There is no change in polarization
4. The radiated signal becomes circularly polarized

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G9C19 (B)  
How does antenna gain stated in dBi compare to gain stated in dBd for the same antenna?

1. dBi gain figures are 2.15 dB lower then dBd gain figures
2. dBi gain figures are 2.15 dB higher than dBd gain figures MEMORIZE
3. dBi gain figures are the same as the square root of dBd gain figures multiplied by 2.15
4. dBi gain figures are the reciprocal of dBd gain figures + 2.15 dB

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G9C20 (A) i means isotropic d means dipole  
What is meant by the terms dBi and dBd when referring to antenna gain?  
A. dBi refers to an isotropic antenna, dBd refers to a dipole antenna  
B. dBi refers to an ionospheric reflecting antenna, dBd refers to a dissipative antenna C. dBi refers to an inverted-vee antenna, dBd refers to a downward reflecting antenna D. dBi refers to an isometric antenna, dBd refers to a discone antenna

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G9D - Specialized antennas

G9D01 (D) near vertical incident skywave  
What does the term NVIS mean as related to antennas? S MEANS SKY WAVE

1. Nearly Vertical Inductance System
2. Non-Varying Indicated SWR
3. Non-Varying Impedance Smoothing
4. Near Vertical Incidence sky-wave

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G9D02 (B)  
Which of the following is an advantage of an NVIS antenna?

1. Low vertical angle radiation for working stations out to ranges of several thousand kilometers
2. High vertical angle radiation for working stations within a radius of a few hundred kilometers
3. High forward gain
4. All of these choices are correct

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G9D03 (D)  
At what height above ground is an NVIS antenna typically installed? LOW TO THE GROUND

1. As close to 1/2 wavelength as possible
2. As close to one wavelength as possible
3. Height is not critical as long as it is significantly more than 1/2 wavelength
4. Between 1/10 and 1/4 wavelength

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G9D04 (A)  
What is the primary purpose of antenna traps?

1. To permit multiband operation
2. To notch spurious frequencies
3. To provide balanced feed point impedance
4. To prevent out of band operation

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G9D05 (D)  
What is an advantage of vertical stacking of horizontally polarized Yagi antennas?

1. It allows quick selection of vertical or horizontal polarization
2. It allows simultaneous vertical and horizontal polarization
3. It narrows the main lobe in azimuth
4. It narrows the main lobe in elevation

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G9D06 (A)  
Which of the following is an advantage of a log periodic antenna?

1. Wide bandwidth
2. Higher gain per element than a Yagi antenna
3. Harmonic suppression
4. Polarization diversity

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G9D07 (A)  
Which of the following describes a log periodic antenna? LOGS GET LONGER FROM ONE END TO THE OTHER

1. Length and spacing of the elements increase logarithmically from one end of the boom to the other
2. Impedance varies periodically as a function of frequency
3. Gain varies logarithmically as a function of frequency
4. SWR varies periodically as a function of boom length

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G9D08 (B)  
Why is a Beverage antenna not used for transmitting? BEVERAGE (BEER) YOR GET A LOT OF LOSS (PEE)

1. Its impedance is too low for effective matching
2. It has high losses compared to other types of antennas
3. It has poor directivity
4. All of these choices are correct

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G9D09 (B) IF ITS NOT USED FOR TRANSMITTING, ITS ONLY GOOD FOR RECEIVING.  
Which of the following is an application for a Beverage antenna?

1. Directional transmitting for low HF bands
2. Directional receiving for low HF bands
3. Portable direction finding at higher HF frequencies
4. Portable direction finding at lower HF frequencies

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G9D10 (D)  
Which of the following describes a Beverage antenna?

1. A vertical antenna
2. A broad-band mobile antenna
3. A helical antenna for space reception
4. A very long and low directional receiving antenna

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G9D11 (D)  
Which of the following is a disadvantage of multiband antennas? MULTI, TOO MANY NOTES ON THE HARMONICA

1. They present low impedance on all design frequencies
2. They must be used with an antenna tuner
3. They must be fed with open wire line
4. They have poor harmonic rejection

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