General Class Study Group Chapter 9
Antennas and Feedlines

Four questions from this chapter will be on the test.

Manual pages 9-1 to 9-3

G9C01
1. What type of multiband transmitting antenna does NOT require a feed-line?
A. An end-fed random-wire antenna
B. A triband Yagi antenna
C. A delta-loop antenna
D. A Beverage antenna

G9C02
2. What is one advantage of using a random-wire antenna?
A. It is more efficient than any other kind of antenna
B. It will keep RF energy out of your station
C. It doesn't need an impedance matching network
D. It is a multiband antenna

G9C03
3. What is one disadvantage of a random-wire antenna?
A. It must be longer than 1 wavelength
B. You may experience RF feedback in your station
C. It usually produces vertically polarized radiation
D. You must use an inverted-T matching network for multiband operation

Manual pages 9-3 to 9-5

G9C04
4. What is an advantage of downward sloping radials on a ground-plane antenna?
A. It lowers the radiation angle
B. It brings the feed-point impedance closer to 300 ohms
C. It increases the radiation angle
D. It brings the feed-point impedance closer to 50 ohms

G9C05
5. What happens to the feed-point impedance of a ground-plane antenna when its radials are changed from horizontal to downward-sloping?
A. It decreases
B. It increases
C. It stays the same
D. It approaches zero

G9C11
6. 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 top of the antenna

Manual pages 9-5 to 9-6

G9C06
7. What is the low-angle radiation pattern of an ideal half-wavelength dipole HF antenna installed a half-wavelength high, parallel to the earth?
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 is two smaller lobes on one side of the antenna, and one larger lobe on the other side

G9C07
8. How does antenna height affect the horizontal (azimuthal) radiation pattern of a horizontal dipole HF antenna?
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 one-half wavelength high, the azimuthal pattern is almost omnidirectional
D. If the antenna is less than one-half wavelength high, radiation off the ends of the wire is eliminated

Manual pages 9-6 to 9-8

G9C09
9. If a slightly shorter parasitic element is placed 0.1 wavelength away and parallel to an HF dipole antenna mounted above ground, what effect will this have on the antenna's radiation pattern?
A. The radiation pattern will not be affected
B. A major lobe will develop in the horizontal plane, parallel to the two elements
C. A major lobe will develop in the vertical plane, away from the ground
D. A major lobe will develop in the horizontal plane, toward the parasitic element

G9C10
10. If a slightly longer parasitic element is placed 0.1 wavelength away and parallel to an HF dipole antenna mounted above ground, what effect will this have on the antenna's radiation pattern?
A. The radiation pattern will not be affected
B. A major lobe will develop in the horizontal plane, away from the parasitic element, toward the dipole
C. A major lobe will develop in the vertical plane, away from the ground
D. A major lobe will develop in the horizontal plane, parallel to the two elements

Manual pages 9-8 to 9-10

G9A02
11. Approximately how long is the driven element of a Yagi antenna for 14.0 MHz?
A. 17 feet
B. 33 feet
C. 35 feet
D. 66 feet

G9A03
12. Approximately how long is the director element of a Yagi antenna for 21.1 MHz?
A. 42 feet
B. 21 feet
C. 17 feet
D. 10.5 feet

G9A04
13. Approximately how long is the reflector element of a Yagi antenna for 28.1 MHz?
A. 8.75 feet
B. 16.6 feet
C. 17.5 feet
D. 35 feet

G9A05
14. Which statement about a three-element Yagi antenna is true?
A. The reflector is normally the shortest parasitic element
B. The director is normally the shortest parasitic element
C. The driven element is the longest parasitic element
D. Low feed-point impedance increases bandwidth

Manual pages 9-10 to 9-12

G9A01
15. When designing a Yagi antenna, how can the SWR bandwidth be increased?
A. Use larger diameter elements
B. Use closer element spacing
C. Use traps on the elements
D. Use tapered-diameter elements

G9A06
16. What is one effect of increasing the boom length and adding directors to a Yagi antenna?
A. Gain increases
B. SWR increases
C. Weight decreases
D. Wind load decreases

G9A07
17. Why is a Yagi antenna often used for radio communications on the 20-meter band?
A. It provides excellent omnidirectional coverage in the horizontal Plane
B. It is smaller, less expensive and easier to erect than a dipole or vertical antenna
C. It helps reduce interference from other stations off to the side or behind
D. It provides the highest possible angle of radiation for the HF bands

G9A08
18. What does "antenna 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 power radiated in the major radiation lobe compared to the power radiated 90 degrees away from that direction

G9A09
19. What is the "main lobe" of a Yagi antenna radiation pattern?
A. The direction of least radiation from the antenna
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

G9A10
20. What is a good way to get maximum performance from a Yagi antenna?
A. Optimize the lengths and spacing of the elements
B. Use RG-58 feed-line
C. Use a reactance bridge to measure the antenna performance from each direction around the antenna
D. Avoid using towers higher than 30 feet above the ground

G9A11
21. Which of the following is NOT a Yagi antenna design variable that should be considered to optimize the forward gain, front-to-rear ratio and SWR bandwidth?
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. The polarization of the antenna elements

G9C08
22. If the horizontal radiation pattern of an antenna shows a major lobe at 0 degrees and a minor lobe at 180 degrees, how would you describe the radiation pattern of this antenna?
A. Most of the signal would be radiated towards 180 degrees and a smaller amount would be radiated towards 0 degrees
B. Almost no signal would be radiated towards 0 degrees and a small amount would be radiated towards 180 degrees

C. Almost all the signal would be radiated equally towards 0 degrees and 180 degrees
D. Most of the signal would be radiated towards 0 degrees and a smaller amount would be radiated towards 180 degrees

Manual pages 9-12 to 9-16

G9B01
23. Approximately how long is each side of a cubical-quad antenna driven element for 21.4 MHz?
A. 1.17 feet
B. 11.7 feet
C. 47 feet
D. 469 feet

G9B02
24. Approximately how long is each side of a cubical-quad antenna driven element for 14.3 MHz?
A. 17.6 feet
B. 23.4 feet
C. 70.3 feet
D. 175 feet

G9B03
25. Approximately how long is each side of a cubical-quad antenna reflector element for 29.6 MHz?
A. 8.23 feet
B. 8.7 feet
C. 9.7 feet
D. 34.8 feet

G9B04
26. Approximately how long is each leg of a symmetrical delta-loop antenna driven element for 28.7 MHz?
A. 8.75 feet
B. 11.7 feet
C. 23.4 feet
D. 35 feet

G9B05
27. Approximately how long is each leg of a symmetrical delta-loop antenna driven element for 24.9 MHz?
A. 10.99 feet
B. 12.95 feet
C. 13.45 feet
D. 40.36 feet

G9B06
28. Approximately how long is each leg of a symmetrical delta-loop antenna reflector element for 14.1 MHz?
A. 18.26 feet
B. 23.76 feet
C. 24.35 feet
D. 73.05 feet

G9B07
29. Which statement about quad antennas is true?
A. They compare favorably with a three-element Yagi
B. They perform poorly above HF
C. They perform very well only at HF
D. They are effective only when constructed using insulated wire

G9B08
30. Compared to a dipole antenna, what are the directional radiation characteristics of a cubical-quad antenna?
A. The quad has more directivity in the horizontal plane but less directivity in the vertical plane
B. The quad has less directivity in the horizontal plane but more directivity in the vertical plane
C. The quad has less directivity in both horizontal and vertical planes
D. The quad has more directivity in both horizontal and vertical planes

G9B09
31. Moving the feed point of a multielement quad antenna from a side parallel to the ground to a side perpendicular to the ground will have what effect?
A. It will significantly increase the antenna feed-point impedance
B. It will significantly decrease the antenna feed-point impedance
C. It will change the antenna polarization from vertical to horizontal
D. It will change the antenna polarization from horizontal to vertical

G9B10
32. What does the term "antenna front-to-back ratio" mean in reference to a cubical-quad 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 90 degrees away from that direction
D. The power radiated in the major radiation lobe compared to the power radiated in exactly the opposite direction

G9B11
33. What is the "main lobe" of a cubical-quad antenna radiation pattern?
A. The direction of least radiation from an antenna
B. The point of maximum current in a radiating antenna element
C. The direction of maximum radiated field strength from the antenna
D. The maximum voltage standing wave point on a radiating element

Manual pages 9-16 to 9-19

G9D01
34. Which of the following factors help determine the characteristic impedance of a parallel-conductor antenna 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

G9D02
35. What is the typical characteristic impedance of coaxial cables used for antenna feed-lines at amateur stations?
A. 25 and 30 ohms
B. 50 and 75 ohms
C. 80 and 100 ohms
D. 500 and 750 ohms

G9D03
36. What is the characteristic impedance of flat-ribbon TV-type twin-lead?
A. 50 ohms
B. 75 ohms
C. 100 ohms
D. 300 ohms

G9D07
37. If a 160-meter signal and a 2-meter signal pass through the same coaxial cable, how will the attenuation of the two signals compare?
A. It will be greater at 2 meters
B. It will be less at 2 meters
C. It will be the same at both frequencies
D. It will depend on the emission type in use

G9D08
38. In what values are RF feed line losses usually expressed?
A. Bels/1000 ft
B. dB/1000 ft
C. Bels/100 ft
D. dB/100 ft

G9D12
39. What physical aspects of an air-insulated parallel-conductor transmission line determine its characteristic impedance?
A. The RF resistance of the conductors and the length of the conductors
B. The diameter of the conductors and the distance between their centers
C. The RF resistance of the conductors and the dielectric constant of the insulation
D. The resistance of each wire to RF ground and the antenna's impedance

Manual pages 9-19 to 9-21

G9D04
40. What is the typical cause of power being reflected back down an antenna feedline?
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
G9D05
41. What must be done to prevent standing waves of voltage and current on an antenna feed-line?
A. The antenna feed point must be at DC ground potential
B. The feed line must be cut to an odd number of electrical quarterwavelengths long
C. The feed line must be cut to 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

G9D06
42. Under what conditions would you use an inductively coupled matching network with a dipole antenna fed with parallel-conductor feed line?
A. It would not normally be used with parallel-conductor feed lines
B. It would be used to increase the SWR to an acceptable level
C. It would be used to match the unbalanced transmitter output to the balanced parallel-conductor feed line
D. It would be used at the antenna feed point to tune out the radiation resistance

G9D09
43. What standing-wave-ratio will result from the connection of a 50-ohm feed line to a resonant antenna having a 200-ohm feed-point impedance?
A. 4:1
B. 1:4
C. 2:1
D. 1:2

G9D10
44. What standing-wave-ratio will result from the connection of a 50-ohm feed line to a resonant antenna having a 10-ohm feed-point impedance?
A. 2:1
B. 50:1
C. 1:5
D. 5:1

G9D11
45. What standing-wave-ratio will result from the connection of a 50-ohm feed line to a resonant antenna having a 50-ohm feed-point impedance?
A. 2:1
B. 1:1
C. 50:50

D. 0:0

G9D13
46. What would be the SWR if you feed a vertical antenna that has a 25-ohm feedpoint impedance with 50-ohm coaxial cable?
A. 2:1
B. 2.5:1
C. 1.25:1
D. You cannot determine SWR from impedance values

G9D14
47. What would be the SWR if you feed a folded dipole antenna that has a 300-ohm feed-point impedance with 50-ohm coaxial cable?
A. 1.5:1
B. 3:1
C. 6:1
D. You cannot determine SWR from impedance values