2022-2026 Technician Class
FCC Element 2 Question Pool
Effective 7/01/2022 – 6/30/2026

SUBELEMENT T9 – ANTENNAS AND FEED LINES - [2 Exam Questions - 2 Groups]

T9A – Antennas: vertical and horizontal polarization, concept of antenna gain, definition and types of beam antennas, antenna loading, common portable and mobile antennas, relationships between resonant length and frequency, dipole pattern

T9A01
What is a beam antenna?
A. An antenna built from aluminum I-beams
B. An omnidirectional antenna invented by Clarence Beam
C. An antenna that concentrates signals in one direction
D. An antenna that reverses the phase of received signals
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T9A02
Which of the following describes a type of antenna loading?
A. Electrically lengthening by inserting inductors in radiating elements
B. Inserting a resistor in the radiating portion of the antenna to make it resonant
C. Installing a spring in the base of a mobile vertical antenna to make it more flexible
D. Strengthening the radiating elements of a beam antenna to better resist wind damage
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T9A03
Which of the following describes a simple dipole oriented parallel to Earth's surface?
A. A ground-wave antenna
B. A horizontally polarized antenna
C. A travelling-wave antenna
D. A vertically polarized antenna
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T9A04
What is a disadvantage of the short, flexible antenna supplied with most handheld radio transceivers, compared to a full-sized quarter-wave antenna?
A. It has low efficiency
B. It transmits only circularly polarized signals
C. It is mechanically fragile
D. All these choices are correct
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T9A05

Which of the following increases the resonant frequency of a dipole antenna?

A. Lengthening it

B. Inserting coils in series with radiating wires

C. Shortening it

D. Adding capacitive loading to the ends of the radiating wires

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T9A06

Which of the following types of antenna offers the greatest gain?

A. 5/8 wave vertical

B. Isotropic

C. J pole

D. Yagi

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T9A07

What is a disadvantage of using a handheld VHF transceiver with a flexible antenna inside a vehicle?

A. Signal strength is reduced due to the shielding effect of the vehicle

B. The bandwidth of the antenna will decrease, increasing SWR

C. The SWR might decrease, decreasing the signal strength

D. All these choices are correct

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T9A08

What is the approximate length, in inches, of a quarter-wavelength vertical antenna for 146 MHz?

A. 112

B. 50

C. 19

D. 12

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T9A09

What is the approximate length, in inches, of a half-wavelength 6 meter dipole antenna?

A. 6

B. 50

C. 112

D. 236

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T9A10

In which direction does a half-wave dipole antenna radiate the strongest signal?

A. Equally in all directions

B. Off the ends of the antenna

C. In the direction of the feed line

D. Broadside to the antenna

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T9A11

What is antenna gain?

A. The additional power that is added to the transmitter power
B. The additional power that is required in the antenna when transmitting on a higher frequency
C. The increase in signal strength in a specified direction compared to a reference antenna
D. The increase in impedance on receive or transmit compared to a reference antenna
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T9A12

What is an advantage of a 5/8 wavelength whip antenna for VHF or UHF mobile service?

A. It has more gain than a 1/4-wavelength antenna
B. It radiates at a very high angle
C. It eliminates distortion caused by reflected signals
D. It has 10 times the power gain of a 1/4 wavelength whip
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T9B – Feed lines: types, attenuation vs frequency, selecting; SWR concepts; Antenna tuners (couplers); RF Connectors: selecting, weather protection

T9B01

What is a benefit of low SWR?

A. Reduced television interference
B. Reduced signal loss
C. Less antenna wear
D. All these choices are correct
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T9B02

What is the most common impedance of coaxial cables used in amateur radio?

A. 8 ohms
B. 50 ohms
C. 600 ohms
D. 12 ohms
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T9B03

Why is coaxial cable the most common feed line for amateur radio antenna systems?

A. It is easy to use and requires few special installation considerations
B. It has less loss than any other type of feed line
C. It can handle more power than any other type of feed line
D. It is less expensive than any other type of feed line
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T9B04

What is the major function of an antenna tuner (antenna coupler)?

A. It matches the antenna system impedance to the transceiver's output impedance
B. It helps a receiver automatically tune in weak stations
C. It allows an antenna to be used on both transmit and receive
D. It automatically selects the proper antenna for the frequency band being used
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T9B05

What happens as the frequency of a signal in coaxial cable is increased?

A. The characteristic impedance decreases
B. The loss decreases
C. The characteristic impedance increases
D. The loss increases
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T9B06

Which of the following RF connector types is most suitable for frequencies above 400 MHz?

A. UHF (PL-259/SO-239)
B. Type N
C. RS-213
D. DB-25
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T9B07

Which of the following is true of PL-259 type coax connectors?

A. They are preferred for microwave operation
B. They are watertight
C. They are commonly used at HF and VHF frequencies
D. They are a bayonet-type connector
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T9B08

Which of the following is a source of loss in coaxial feed line?

A. Water intrusion into coaxial connectors
B. High SWR
C. Multiple connectors in the line
D. All these choices are correct
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T9B09

What can cause erratic changes in SWR?

A. Local thunderstorm
B. Loose connection in the antenna or feed line
C. Over-modulation
D. Overload from a strong local station
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T9B10

What is the electrical difference between RG-58 and RG-213 coaxial cable?

A. There is no significant difference between the two types
B. RG-58 cable has two shields
C. RG-213 cable has less loss at a given frequency
D. RG-58 cable can handle higher power levels
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T9B11

Which of the following types of feed line has the lowest loss at VHF and UHF?

A. 50-ohm flexible coax
B. Multi-conductor unbalanced cable
C. Air-insulated hardline
D. 75-ohm flexible coax
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T9B12

What is standing wave ratio (SWR)?

A. A measure of how well a load is matched to a transmission line
B. The ratio of amplifier power output to input
C. The transmitter efficiency ratio
D. An indication of the quality of your station’s ground connection
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