

1-1 T1A01 Which of the following is a purpose of the Amateur Radio Service as stated in the FCC rules and regulations?

- A. Providing personal radio communications for as many citizens as possible
- B. Providing communications for international non-profit organizations
- C. Advancing skills in the technical and communication phases of the radio art
- D. All of these choices are correct

1-2 T1B11 What is the maximum peak envelope power output for Technician class operators using their assigned portions of the HF bands?

- A. 200 watts
- B. 100 watts
- C. 50 watts
- D. 10 watts

1-3 T1C04 When are you allowed to operate your amateur station in a foreign country?

- A. When the foreign country authorizes it
- B. When there is a mutual agreement allowing third party communications
- C. When authorization permits amateur communications in a foreign language
- D. When you are communicating with non-licensed individuals in another country

1-4 T1D04 Under what conditions is an amateur station authorized to transmit music using a phone emission?

- A. When incidental to an authorized retransmission of manned spacecraft communications
- B. When the music produces no spurious emissions
- C. When the purpose is to interfere with an illegal transmission
- D. When the music is transmitted above 1280 MHz

1-5 T1E01 When is an amateur station permitted to transmit without a control operator?

- A. When using automatic control, such as in the case of a repeater
- B. When the station licensee is away and another licensed amateur is using the station
- C. When the transmitting station is an auxiliary station
- D. Never

1-6 T1F04 Which of the following is an acceptable language to use for station identification when operating in a phone sub-band?

- A. Any language recognized by the United Nations
- B. Any language recognized by the ITU
- C. The English language
- D. English, French, or Spanish

1-7 T2A03 What is a common repeater frequency offset in the 70 cm band?

- A. Plus or minus 5 MHz
- B. Plus or minus 600 kHz
- C. Plus or minus 500 kHz
- D. Plus or minus 1 MHz

1-8 T2B05 What might be the problem if a repeater user says your transmissions are breaking up on voice peaks?

- A. You have the incorrect offset
- B. You need to talk louder
- C. You are talking too loudly
- D. Your transmit power is too high

1-9 T2C05 What does the term traffic refer to in net operation?

- A. Formal messages exchanged by net stations
- B. The number of stations checking in and out of a net
- C. Operation by mobile or portable stations
- D. Requests to activate the net by a served agency

1-10 T3A03 What antenna polarization is normally used for long-distance weak-signal CW and SSB contacts using the VHF and UHF bands?

- A. Right-hand circular
- B. Left-hand circular
- C. Horizontal
- D. Vertical

1-11 T3B01 What is the name for the distance a radio wave travels during one complete cycle?

- A. Wave speed
- B. Waveform
- C. Wavelength
- D. Wave spread

1-12 T3C01 Why are direct (not via a repeater) UHF signals rarely heard from stations outside your local coverage area?

- A. They are too weak to go very far
- B. FCC regulations prohibit them from going more than 50 miles
- C. UHF signals are usually not reflected by the ionosphere
- D. UHF signals are absorbed by the ionospheric D layer

1-13 T4A01 What must be considered to determine the minimum current capacity needed for a transceiver power supply?

- A. Efficiency of the transmitter at full power output
- B. Receiver and control circuit power
- C. Power supply regulation and heat dissipation
- D. All of these choices are correct

1-14 T4B01 What may happen if a transmitter is operated with the microphone gain set too high?

- A. The output power might be too high
- B. The output signal might become distorted
- C. The frequency might vary
- D. The SWR might increase

1-15 T5A03 What is the name for the flow of electrons in an electric circuit?

- A. Voltage
- B. Resistance
- C. Capacitance
- D. Current

1-16 T5B02 What is another way to specify a radio signal frequency of 1,500,000 hertz?

- A. 1500 kHz
- B. 1500 MHz
- C. 15 GHz
- D. 150 kHz

1-17 T5C01 What is the ability to store energy in an electric field called?

- A. Inductance
- B. Resistance
- C. Tolerance
- D. Capacitance

1-18 T5D01 What formula is used to calculate current in a circuit?

- A. Current (I) equals voltage (E) multiplied by resistance (R)
- B. Current (I) equals voltage (E) divided by resistance (R)
- C. Current (I) equals voltage (E) added to resistance (R)
- D. Current (I) equals voltage (E) minus resistance (R)

1-19 T6A01 What electrical component opposes the flow of current in a DC circuit?

- A. Inductor
- B. Resistor
- C. Voltmeter
- D. Transformer

1-20 T6B01 What class of electronic components uses a voltage or current signal to control current flow?

- A. Capacitors
- B. Inductors
- C. Resistors
- D. Transistors

1-21 T6C01 What is the name of an electrical wiring diagram that uses standard component symbols?

- A. Bill of materials
- B. Connector pinout
- C. Schematic
- D. Flow chart

1-22 T6D04 Which of the following displays an electrical quantity as a numeric value?

- A. Potentiometer
- B. Transistor
- C. Meter
- D. Relay

1-23 T7A03 Which of the following is used to convert a radio signal from one frequency to another?

- A. Phase splitter
- B. Mixer
- C. Inverter
- D. Amplifier

1-24 T7B02 What would cause a broadcast AM or FM radio to receive an amateur radio transmission unintentionally?

- A. The receiver is unable to reject strong signals outside the AM or FM band
- B. The microphone gain of the transmitter is turned up too high
- C. The audio amplifier of the transmitter is overloaded
- D. The deviation of an FM transmitter is set too low

1-25 T7C01 What is the primary purpose of a dummy load?

- A. To prevent transmitting signals over the air when making tests
- B. To prevent over-modulation of a transmitter
- C. To improve the efficiency of an antenna
- D. To improve the signal-to-noise ratio of a receiver

1-26 T7D01 Which instrument would you use to measure electric potential or electromotive force?

- A. An ammeter
- B. A voltmeter
- C. A wavemeter
- D. An ohmmeter

1-27 T8A01 Which of the following is a form of amplitude modulation?

- A. Spread spectrum
- B. Packet radio
- C. Single sideband
- D. Phase shift keying (PSK)

1-28 T8B02 What is the impact of using too much effective radiated power on a satellite uplink?

- A. Possibility of commanding the satellite to an improper mode
- B. Blocking access by other users
- C. Overloading the satellite batteries
- D. Possibility of rebooting the satellite control computer

1-29 T8C03 What operating activity involves contacting as many stations as possible during a specified period?

- A. Contesting
- B. Net operations
- C. Public service events
- D. Simulated emergency exercises

1-30 T8D02 What does the term APRS mean?

- A. Automatic Packet Reporting System
- B. Associated Public Radio Station
- C. Auto Planning Radio Set-up
- D. Advanced Polar Radio System

1-31 T9A03 Which of the following describes a simple dipole oriented parallel to the Earth's surface?

- A. A ground-wave antenna
- B. A horizontally polarized antenna
- C. A rhombic antenna
- D. A vertically polarized antenna

1-32 T9B01 Why is it important to have low SWR when using coaxial cable feed line?

- A. To reduce television interference
- B. To reduce signal loss
- C. To prolong antenna life
- D. All of these choices are correct

1-33 T0A01 Which of the following is a safety hazard of a 12-volt storage battery?

- A. Touching both terminals with the hands can cause electrical shock
- B. Shorting the terminals can cause burns, fire, or an explosion
- C. RF emissions from the battery
- D. All of these choices are correct

1-34 T0B05 What is the purpose of a gin pole?

- A. To temporarily replace guy wires
- B. To be used in place of a safety harness
- C. To lift tower sections or antennas
- D. To provide a temporary ground

1-35 T0C02 Which of the following frequencies has the lowest value for Maximum Permissible Exposure limit?

- A. 3.5 MHz
- B. 50 MHz
- C. 440 MHz
- D. 1296 MHz

1-1 T1A01 (C)

1-2 T1B11 (A)

1-3 T1C04 (A)

1-4 T1D04 (A)

1-5 T1E01 (D)

1-6 T1F04 (C)

1-7 T2A03 (A)

1-8 T2B05 (C)

1-9 T2C05 (A)

1-10 T3A03 (C)

1-11 T3B01 (C)

1-12 T3C01 (C)

1-13 T4A01 (D)

1-14 T4B01 (B)

1-15 T5A03 (D)

1-16 T5B02 (A)

1-17 T5C01 (D)

1-18 T5D01 (B)

1-19 T6A01 (B)

1-20 T6B01 (D)

1-21 T6C01 (C)

1-22 T6D04 (C)

1-23 T7A03 (B)

1-24 T7B02 (A)

1-25 T7C01 (A)

1-26 T7D01 (B)

1-27 T8A01 (C)

1-28 T8B02 (B)

1-29 T8C03 (A)

1-30 T8D02 (A)

1-31 T9A03 (B)

1-32 T9B01 (B)

1-33 T0A01 (B)

1-34 T0B05 (C)

1-35 T0C02 (B)

2-1 T1A04 How many operator/primary station license grants may be held by any one person?

- A. One
- B. No more than two
- C. One for each band on which the person plans to operate
- D. One for each permanent station location from which the person plans to operate

2-2 T1B04 Which amateur band are you using when your station is transmitting on 146.52 MHz?

- A. 2 meter band
- B. 20 meter band
- C. 14 meter band
- D. 6 meter band

2-3 T1C03 What types of international communications is an FCC-licensed amateur radio station permitted to make?

- A. Communications incidental to the purposes of the Amateur Radio Service and remarks of a personal character
- B. Communications incidental to conducting business or remarks of a personal nature
- C. Only communications incidental to contest exchanges, all other communications are prohibited
- D. Any communications that would be permitted by an international broadcast station

2-4 T1D07 What types of amateur stations can automatically retransmit the signals of other amateur stations?

- A. Auxiliary, beacon, or Earth stations
- B. Repeater, auxiliary, or space stations
- C. Beacon, repeater, or space stations
- D. Earth, repeater, or space stations

2-5 T1E04 What determines the transmitting privileges of an amateur station?

- A. The frequency authorized by the frequency coordinator
- B. The frequencies printed on the license grant
- C. The highest class of operator license held by anyone on the premises
- D. The class of operator license held by the control operator

2-6 T1F03 When is an amateur station required to transmit its assigned call sign?

- A. At the beginning of each contact, and every 10 minutes thereafter
- B. At least once during each transmission
- C. At least every 15 minutes during and at the end of a communication
- D. At least every 10 minutes during and at the end of a communication

2-7 T2A06 Which of the following is required when making on-the-air test transmissions?

- A. Identify the transmitting station
- B. Conduct tests only between 10 p.m. and 6 a.m. local time
- C. Notify the FCC of the transmissions
- D. All of these choices are correct

2-8 T2B08 Which of the following applies when two stations transmitting on the same frequency interfere with each other?

- A. Common courtesy should prevail, but no one has absolute right to an amateur frequency
- B. Whoever has the strongest signal has priority on the frequency
- C. Whoever has been on the frequency the longest has priority on the frequency
- D. The station that has the weakest signal has priority on the frequency

2-9 T2C06 Which of the following is an accepted practice to get the immediate attention of a net control station when reporting an emergency?

- A. Repeat "SOS" three times followed by the call sign of the reporting station
- B. Press the push-to-talk button three times
- C. Begin your transmission by saying "Priority" or "Emergency" followed by your call sign
- D. Play a pre-recorded emergency alert tone followed by your call sign

2-10 T3A05 When using a directional antenna, how might your station be able to access a distant repeater if buildings or obstructions are blocking the direct line of sight path?

- A. Change from vertical to horizontal polarization
- B. Try to find a path that reflects signals to the repeater
- C. Try the long path
- D. Increase the antenna SWR

2-11 T3B03 What are the two components of a radio wave?

- A. AC and DC
- B. Voltage and current
- C. Electric and magnetic fields
- D. Ionizing and non-ionizing radiation

2-12 T3C05 Which of the following effects might cause radio signals to be heard despite obstructions between the transmitting and receiving stations?

- A. Knife-edge diffraction
- B. Faraday rotation
- C. Quantum tunneling
- D. Doppler shift

2-13 T4A05 What is the proper location for an external SWR meter?

- A. In series with the feed line, between the transmitter and antenna
- B. In series with the station's ground
- C. In parallel with the push-to-talk line and the antenna
- D. In series with the power supply cable, as close as possible to the radio

2-14 T4B02 Which of the following can be used to enter the operating frequency on a modern transceiver?

- A. The keypad or VFO knob
- B. The CTCSS or DTMF encoder
- C. The Automatic Frequency Control
- D. All of these choices are correct

- 2-15 T5A04 What is the name for a current that flows only in one direction?
A. Alternating current B. Direct current C. Normal current D. Smooth current
- 2-16 T5B04 How many volts are equal to one microvolt?
A. One one-millionth of a volt B. One million volts
C. One thousand kilovolts D. One one-thousandth of a volt
- 2-17 T5C05 What is the unit of frequency?
A. Hertz B. Henry C. Farad D. Tesla
- 2-18 T5D04 What is the resistance of a circuit in which a current of 3 amperes flows through a resistor connected to 90 volts?
A. 3 ohms B. 30 ohms C. 93 ohms D. 270 ohms
- 2-19 T6A03 What electrical parameter is controlled by a potentiometer?
A. Inductance B. Resistance C. Capacitance D. Field strength
- 2-20 T6B03 Which of these components can be used as an electronic switch or amplifier?
A. Oscillator B. Potentiometer C. Transistor D. Voltmeter
- 2-21 T6C02 What is component 1 in figure T1?
A. Resistor B. Transistor C. Battery D. Connector
- 2-22 T6D05 What type of circuit controls the amount of voltage from a power supply?
A. Regulator B. Oscillator C. Filter D. Phase inverter
- 2-23 T7A04 Which term describes the ability of a receiver to discriminate between multiple signals?
A. Discrimination ratio B. Sensitivity
C. Selectivity D. Harmonic distortion
- 2-24 T7B03 Which of the following can cause radio frequency interference?
A. Fundamental overload B. Harmonics
C. Spurious emissions D. All of these choices are correct
- 2-25 T7C04 What reading on an SWR meter indicates a perfect impedance match between the antenna and the feed line?
A. 2 to 1 B. 1 to 3 C. 1 to 1 D. 10 to 1
- 2-26 T7D02 What is the correct way to connect a voltmeter to a circuit?
A. In series with the circuit B. In parallel with the circuit
C. In quadrature with the circuit D. In phase with the circuit

2-27 T8A05 Which of the following types of emission has the narrowest bandwidth?
A. FM voice B. SSB voice C. CW D. Slow-scan TV

2-28 T8B05 What is a satellite beacon?
A. The primary transmit antenna on the satellite
B. An indicator light that shows where to point your antenna
C. A reflective surface on the satellite
D. A transmission from a satellite that contains status information

2-29 T8C04 Which of the following is good procedure when contacting another station in a radio contest?
A. Sign only the last two letters of your call if there are many other stations calling
B. Contact the station twice to be sure that you are in his log
C. Send only the minimum information needed for proper identification and the contest exchange
D. All of these choices are correct

2-30 T8D01 Which of the following is a digital communications mode?
A. Packet radio B. IEEE 802.11 C. JT65 D. All of these choices are correct

2-31 T9A06 What type of antennas are the quad, Yagi, and dish?
A. Non-resonant antennas B. Log periodic antennas
C. Directional antennas D. Isotropic antennas

2-32 T9B03 Why is coaxial cable the most common feed line selected 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

2-33 T0A02 What health hazard is presented by electrical current flowing through the body?
A. It may cause injury by heating tissue
B. It may disrupt the electrical functions of cells
C. It may cause involuntary muscle contractions
D. All of these choices are correct

2-34 T0B06 What is the minimum safe distance from a power line to allow when installing an antenna?

- A. Half the width of your property
- B. The height of the power line above ground
- C. 1/2 wavelength at the operating frequency
- D. Enough so that if the antenna falls unexpectedly, no part of it can come closer than 10 feet to the power wires

2-35 T0C03 What is the maximum power level that an amateur radio station may use at VHF frequencies before an RF exposure evaluation is required?

- A. 1500 watts PEP transmitter output
- B. 1 watt forward power
- C. 50 watts PEP at the antenna
- D. 50 watts PEP reflected power

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|----------------|----------------|
| 2-1 T1A04 (A) | 2-19 T6A03 (B) |
| 2-2 T1B04 (A) | 2-20 T6B03 (C) |
| 2-3 T1C03 (A) | 2-21 T6C02 (A) |
| 2-4 T1D07 (B) | 2-22 T6D05 (A) |
| 2-5 T1E04 (D) | 2-23 T7A04 (C) |
| 2-6 T1F03 (D) | 2-24 T7B03 (D) |
| 2-7 T2A06 (A) | 2-25 T7C04 (C) |
| 2-8 T2B08 (A) | 2-26 T7D02 (B) |
| 2-9 T2C06 (C) | 2-27 T8A05 (C) |
| 2-10 T3A05 (B) | 2-28 T8B05 (D) |
| 2-11 T3B03 (C) | 2-29 T8C04 (C) |
| 2-12 T3C05 (A) | 2-30 T8D01 (D) |
| 2-13 T4A05 (A) | 2-31 T9A06 (C) |
| 2-14 T4B02 (A) | 2-32 T9B03 (A) |
| 2-15 T5A04 (B) | 2-33 T0A02 (D) |
| 2-16 T5B04 (A) | 2-34 T0B06 (D) |
| 2-17 T5C05 (A) | 2-35 T0C03 (C) |
| 2-18 T5D04 (B) | |

3-1 T1A07 What is the FCC Part 97 definition of a space station?

- A. Any satellite orbiting the earth
- B. A manned satellite orbiting the earth
- C. An amateur station located more than 50 km above the Earth's surface
- D. An amateur station using amateur radio satellites for relay of signals

3-2 T1B12 Except for some specific restrictions, what is the maximum peak envelope power output for Technician class operators using frequencies above 30 MHz?

- A. 50 watts
- B. 100 watts
- C. 500 watts
- D. 1500 watts

3-3 T1C02 Who may select a desired call sign under the vanity call sign rules?

- A. Only a licensed amateur with a General or Amateur Extra class license
- B. Only a licensed amateur with an Amateur Extra class license
- C. Only a licensed amateur who has been licensed continuously for more than 10 years
- D. Any licensed amateur

3-4 T1D09 Under which of the following circumstances are amateur stations authorized to transmit signals related to broadcasting, program production, or news gathering, assuming no other means is available?

- A. Only where such communications directly relate to the immediate safety of human life or protection of property
- B. Only when broadcasting communications to or from the space shuttle
- C. Only where noncommercial programming is gathered and supplied exclusively to the National Public Radio network
- D. Only when using amateur repeaters linked to the internet

3-5 T1E06 When, under normal circumstances, may a Technician class licensee be the control operator of a station operating in an exclusive Amateur Extra class operator segment of the amateur bands?

- A. At no time
- B. When operating a special event station
- C. As part of a multi-operator contest team
- D. When using a club station whose trustee is an Amateur Extra class operator licensee

3-6 T1F05 What method of call sign identification is required for a station transmitting phone signals?

- A. Send the call sign followed by the indicator RPT
- B. Send the call sign using a CW or phone emission
- C. Send the call sign followed by the indicator R
- D. Send the call sign using only a phone emission

3-7 T2A08 What is the meaning of the procedural signal CQ?

- A. Call on the quarter hour
- B. A new antenna is being tested (no station should answer)
- C. Only the called station should transmit
- D. Calling any station

3-8 T2B09 What is a talk group on a DMR digital repeater?

- A. A group of operators sharing common interests
- B. A way for groups of users to share a channel at different times without being heard by other users on the channel
- C. A protocol that increases the signal-to-noise ratio when multiple repeaters are linked together
- D. A net that meets at a particular time

3-9 T2C08 Which of the following is a characteristic of good traffic handling?

- A. Passing messages exactly as received
- B. Making decisions as to whether messages are worthy of relay or delivery
- C. Ensuring that any newsworthy messages are relayed to the news media
- D. All of these choices are correct

3-10 T3A08 Which of the following is a likely cause of irregular fading of signals received by ionospheric reflection?

- A. Frequency shift due to Faraday rotation
- B. Interference from thunderstorms
- C. Random combining of signals arriving via different paths
- D. Intermodulation distortion

3-11 T3B05 How does the wavelength of a radio wave relate to its frequency?

- A. The wavelength gets longer as the frequency increases
- B. The wavelength gets shorter as the frequency increases
- C. There is no relationship between wavelength and frequency
- D. The wavelength depends on the bandwidth of the signal

3-12 T3C04 Which of the following propagation types is most commonly associated with occasional strong over-the-horizon signals on the 10, 6, and 2meter bands?

- A. Backscatter
- B. Sporadic E
- C. D layer absorption
- D. Gray-line propagation

3-13 T4A08 Which of the following conductors provides the lowest impedance to RF signals?

- A. Round stranded wire
- B. Round copper-clad steel wire
- C. Twisted-pair cable
- D. Flat strap

3-14 T4B11 What is the function of automatic gain control, or AGC?

- A. To keep received audio relatively constant
- B. To protect an antenna from lightning
- C. To eliminate RF on the station cabling
- D. An asymmetric goniometer control used for antenna matching

3-15 T5A09 What is the name for a current that reverses direction on a regular basis?

- A. Alternating current
- B. Direct current
- C. Circular current
- D. Vertical current

3-16 T5B05 Which of the following is equal to 500 milliwatts?

- A. 0.02 watts
- B. 0.5 watts
- C. 5 watts
- D. 50 watts

3-17 T5C10 How much power is being used in a circuit when the applied voltage is 12 volts DC and the current is 2.5 amperes?

- A. 4.8 watts
- B. 30 watts
- C. 14.5 watts
- D. 0.208 watts

3-18 T5D08 What is the current through a 100-ohm resistor connected across 200 volts?

- A. 20,000 amperes
- B. 0.5 amperes
- C. 2 amperes
- D. 100 amperes

3-19 T6A05 What type of electrical component consists of two or more conductive surfaces separated by an insulator?

- A. Resistor
- B. Potentiometer
- C. Oscillator
- D. Capacitor

3-20 T6B04 Which of the following components can consist of three layers of semiconductor material?

- A. Alternator
- B. Transistor
- C. Triode
- D. Pentagrid converter

3-21 T6C11 What is component 4 in figure T3?

- A. Antenna
- B. Transmitter
- C. Dummy load
- D. Ground

3-22 T6D06 What component is commonly used to change 120V AC house current to a lower AC voltage for other uses?

- A. Variable capacitor
- B. Transformer
- C. Transistor
- D. Diode

3-23 T7A07 What is meant by PTT?

- A. Pre-transmission tuning to reduce transmitter harmonic emission
- B. Precise tone transmissions used to limit repeater access to only certain signals
- C. A primary transformer tuner use to match antennas
- D. The push-to-talk function that switches between receive and transmit

3-24 T7B05 How can overload of a non-amateur radio or TV receiver by an amateur signal be reduced or eliminated?

- A. Block the amateur signal with a filter at the antenna input of the affected receiver
- B. Block the interfering signal with a filter on the amateur transmitter
- C. Switch the transmitter from FM to SSB
- D. Switch the transmitter to a narrow-band mode

3-25 T7C07 What happens to power lost in a feed line?

- A. It increases the SWR
- B. It comes back into your transmitter and could cause damage
- C. It is converted into heat
- D. It can cause distortion of your signal

3-26 T7D08 Which of the following types of solder is best for radio and electronic use?

- A. Acid-core solder
- B. Silver solder
- C. Rosin-core solder
- D. Aluminum solder

3-27 T8A06 Which sideband is normally used for 10 meter HF, VHF, and UHF single-sideband communications?

- A. Upper sideband
- B. Lower sideband
- C. Suppressed sideband
- D. Inverted sideband

3-28 T8B09 What causes spin fading of satellite signals?

- A. Circular polarized noise interference radiated from the sun
- B. Rotation of the satellite and its antennas
- C. Doppler shift of the received signal
- D. Interfering signals within the satellite uplink band

3-29 T8C06 How is access to some IRLP nodes accomplished?

- A. By obtaining a password that is sent via voice to the node
- B. By using DTMF signals
- C. By entering the proper internet password
- D. By using CTCSS tone codes

3-30 T8D09 What code is used when sending CW in the amateur bands?

- A. Baudot
- B. Hamming
- C. International Morse
- D. All of these choices are correct

3-31 T9A09 What is the approximate length, in inches, of a half-wavelength 6 meter dipole antenna?

- A. 6
- B. 50
- C. 112
- D. 236

3-32 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

3-33 T0A05 Why is it unwise to install a 20-ampere fuse in the place of a 5-ampere fuse?
A. The larger fuse would be likely to blow because it is rated for higher current
B. The power supply ripple would greatly increase
C. Excessive current could cause a fire
D. All of these choices are correct

3-34 T0B08 What is considered to be a proper grounding method for a tower?
A. A single four-foot ground rod, driven into the ground no more than 12 inches from the base
B. A ferrite-core RF choke connected between the tower and ground
C. Separate eight-foot long ground rods for each tower leg, bonded to the tower and each other
D. A connection between the tower base and a cold water pipe

3-35 T0C05 Why do exposure limits vary with frequency?
A. Lower frequency RF fields have more energy than higher frequency fields
B. Lower frequency RF fields do not penetrate the human body
C. Higher frequency RF fields are transient in nature
D. The human body absorbs more RF energy at some frequencies than at others

3-1 T1A07 (C)	3-19 T6A05 (D)
3-2 T1B12 (D)	3-20 T6B04 (B)
3-3 T1C02 (D)	3-21 T6C11 (A)
3-4 T1D09 (A)	3-22 T6D06 (B)
3-5 T1E06 (A)	3-23 T7A07 (D)
3-6 T1F05 (B)	3-24 T7B05 (A)
3-7 T2A08 (D)	3-25 T7C07 (C)
3-8 T2B09 (B)	3-26 T7D08 (C)
3-9 T2C08 (A)	3-27 T8A06 (A)
3-10 T3A08 (C)	3-28 T8B09 (B)
3-11 T3B05 (B)	3-29 T8C06 (B)
3-12 T3C04 (B)	3-30 T8D09 (C)
3-13 T4A08 (D)	3-31 T9A09 (C)
3-14 T4B11 (A)	3-32 T9B04 (A)
3-15 T5A09 (A)	3-33 T0A05 (C)
3-16 T5B05 (B)	3-34 T0B08 (C)
3-17 T5C10 (B)	3-35 T0C05 (D)
3-18 T5D08 (C)	

4-1 T1A08 Which of the following entities recommends transmit/receive channels and other parameters for auxiliary and repeater stations?

- A. Frequency Spectrum Manager appointed by the FCC
- B. Volunteer Frequency Coordinator recognized by local amateurs
- C. FCC Regional Field Office
- D. International Telecommunications Union

4-2 T1B08 Which of the following is a result of the fact that the Amateur Radio Service is secondary in all or portions of some amateur bands (such as portions of the 70 cm band)?

- A. U.S. amateurs may find non-amateur stations in those portions, and must avoid interfering with them
- B. U.S. amateurs must give foreign amateur stations priority in those portions
- C. International communications are not permitted in those portions
- D. Digital transmissions are not permitted in those portions

4-3 T1C07 What may result when correspondence from the FCC is returned as undeliverable because the grantee failed to provide and maintain a correct mailing address with the FCC?

- A. Fine or imprisonment
- B. Revocation of the station license or suspension of the operator license
- C. Require the licensee to be re-examined
- D. A reduction of one rank in operator class

4-4 T1D10 What is the meaning of the term broadcasting in the FCC rules for the Amateur Radio Service?

- A. Two-way transmissions by amateur stations
- B. Transmission of music
- C. Transmission of messages directed only to amateur operators
- D. Transmissions intended for reception by the general public

4-5 T1E08 Which of the following is an example of automatic control?

- A. Repeater operation
- B. Controlling the station over the internet
- C. Using a computer or other device to send CW automatically
- D. Using a computer or other device to identify automatically

4-6 T1F09 What type of amateur station simultaneously retransmits the signal of another amateur station on a different channel or channels?

- A. Beacon station
- B. Earth station
- C. Repeater station
- D. Message forwarding station

4-7 T2A09 What brief statement indicates that you are listening on a repeater and looking for a contact?

- A. The words "Hello test" followed by your call sign
- B. Your call sign
- C. The repeater call sign followed by your call sign
- D. The letters QSY followed by your call sign

4-8 T2B10 Which Q signal indicates that you are receiving interference from other stations?

- A. QRM
- B. QRN
- C. QTH
- D. QSB

4-9 T2C09 Are amateur station control operators ever permitted to operate outside the frequency privileges of their license class?

- A. No
- B. Yes, but only when part of a FEMA emergency plan
- C. Yes, but only when part of a RACES emergency plan
- D. Yes, but only if necessary in situations involving the immediate safety of human life or protection of property

4-10 T3A10 What may occur if data signals arrive via multiple paths?

- A. Transmission rates can be increased by a factor equal to the number of separate paths observed
- B. Transmission rates must be decreased by a factor equal to the number of separate paths observed
- C. No significant changes will occur if the signals are transmitted using FM
- D. Error rates are likely to increase

4-11 T3B11 What is the approximate velocity of a radio wave as it travels through free space?

- A. 150,000 kilometers per second
- B. 300,000,000 meters per second
- C. 300,000,000 miles per hour
- D. 150,000 miles per hour

4-12 T3C06 What mode is responsible for allowing over-the-horizon VHF and UHF communications to ranges of approximately 300 miles on a regular basis?

- A. Tropospheric ducting
- B. D layer refraction
- C. F2 layer refraction
- D. Faraday rotation

- 4-13 T4A06 Which of the following connections might be used between a voice transceiver and a computer for digital operation?
- A. Receive and transmit mode, status, and location
 - B. Antenna and RF power
 - C. Receive audio, transmit audio, and push-to-talk (PTT)
 - D. NMEA GPS location and DC power
- 4-14 T4B08 What is the advantage of having multiple receive bandwidth choices on a multimode transceiver?
- A. Permits monitoring several modes at once
 - B. Permits noise or interference reduction by selecting a bandwidth matching the mode
 - C. Increases the number of frequencies that can be stored in memory
 - D. Increases the amount of offset between receive and transmit frequencies
- 4-15 T5A06 How much voltage does a mobile transceiver typically require?
- A. About 12 volts
 - B. About 30 volts
 - C. About 120 volts
 - D. About 240 volts
- 4-16 T5B07 If a frequency display calibrated in megahertz shows a reading of 3.525 MHz, what would it show if it were calibrated in kilohertz?
- A. 0.003525 kHz
 - B. 35.25 kHz
 - C. 3525 kHz
 - D. 3,525,000 kHz
- 4-17 T5C13 What is a unit of impedance?
- A. Volts
 - B. Amperes
 - C. Coulombs
 - D. Ohms
- 4-18 T5D12 What is the voltage across a 10-ohm resistor if a current of 2 amperes flows through it?
- A. 8 volts
 - B. 0.2 volts
 - C. 12 volts
 - D. 20 volts
- 4-19 T6A06 What type of electrical component stores energy in a magnetic field?
- A. Resistor
 - B. Capacitor
 - C. Inductor
 - D. Diode
- 4-20 T6B05 Which of the following electronic components can amplify signals?
- A. Transistor
 - B. Variable resistor
 - C. Electrolytic capacitor
 - D. Multi-cell battery
- 4-21 T6C12 What do the symbols on an electrical schematic represent?
- A. Electrical components
 - B. Logic states
 - C. Digital codes
 - D. Traffic nodes
- 4-22 T6D08 Which of the following is combined with an inductor to make a tuned circuit?
- A. Resistor
 - B. Zener diode
 - C. Potentiometer
 - D. Capacitor

4-23 T7A08 Which of the following describes combining speech with an RF carrier signal?

- A. Impedance matching
- B. Oscillation
- C. Modulation
- D. Low-pass filtering

4-24 T7B07 Which of the following can reduce overload to a VHF transceiver from a nearby FM broadcast station?

- A. RF preamplifier
- B. Double-shielded coaxial cable
- C. Using headphones instead of the speaker
- D. Band-reject filter

4-25 T7C10 Why should the outer jacket of coaxial cable be resistant to ultraviolet light?

- A. Ultraviolet resistant jackets prevent harmonic radiation
- B. Ultraviolet light can increase losses in the cable's jacket
- C. Ultraviolet and RF signals can mix, causing interference
- D. Ultraviolet light can damage the jacket and allow water to enter the cable

4-26 T7D09 What is the characteristic appearance of a cold solder joint?

- A. Dark black spots
- B. A bright or shiny surface
- C. A grainy or dull surface
- D. A greenish tint

4-27 T8A08 What is the approximate bandwidth of a single sideband (SSB) voice signal?

- A. 1 kHz
- B. 3 kHz
- C. 6 kHz
- D. 15 kHz

4-28 T8B10 What do the initials LEO tell you about an amateur satellite?

- A. The satellite battery is in Low Energy Operation mode
- B. The satellite is performing a Lunar Ejection Orbit maneuver
- C. The satellite is in a Low Earth Orbit
- D. The satellite uses Light Emitting Optics

4-29 T8C09 How might you obtain a list of active nodes that use VoIP?

- A. By subscribing to an on line service
- B. From on line repeater lists maintained by the local repeater frequency coordinator
- C. From a repeater directory
- D. All of these choices are correct

4-30 T8D05 Which of the following is an application of APRS (Automatic Packet Reporting System)?

- A. Providing real-time tactical digital communications in conjunction with a map showing the locations of stations
- B. Showing automatically the number of packets transmitted via PACTOR during a specific time interval
- C. Providing voice over internet connection between repeaters
- D. Providing information on the number of stations signed into a repeater

4-31 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. Broadside to the antenna
- D. In the direction of the feed line

4-32 T9B05 In general, what happens as the frequency of a signal passing through coaxial cable is increased?

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

4-33 T0A09 What should be done to all external ground rods or earth connections?

- A. Waterproof them with silicone caulk or electrical tape
- B. Keep them as far apart as possible
- C. Bond them together with heavy wire or conductive strap
- D. Tune them for resonance on the lowest frequency of operation

4-34 T0B09 Why should you avoid attaching an antenna to a utility pole?

- A. The antenna will not work properly because of induced voltages
- B. The utility company will charge you an extra monthly fee
- C. The antenna could contact high-voltage power lines
- D. All of these choices are correct

4-35 T0C08 Which of the following actions might amateur operators take to prevent exposure to RF radiation in excess of FCC-supplied limits?

- A. Relocate antennas
- B. Relocate the transmitter
- C. Increase the duty cycle
- D. All of these choices are correct

- 4-1 T1A08 (B)
- 4-2 T1B08 (A)
- 4-3 T1C07 (B)
- 4-4 T1D10 (D)
- 4-5 T1E08 (A)
- 4-6 T1F09 (C)
- 4-7 T2A09 (B)
- 4-8 T2B10 (A)
- 4-9 T2C09 (D)
- 4-10 T3A10 (D)
- 4-11 T3B11 (B)
- 4-12 T3C06 (A)
- 4-13 T4A06 (C)
- 4-14 T4B08 (B)
- 4-15 T5A06 (A)
- 4-16 T5B07 (C)
- 4-17 T5C13 (D)
- 4-18 T5D12 (D)
- 4-19 T6A06 (C)
- 4-20 T6B05 (A)
- 4-21 T6C12 (A)
- 4-22 T6D08 (D)
- 4-23 T7A08 (C)
- 4-24 T7B07 (D)
- 4-25 T7C10 (D)
- 4-26 T7D09 (C)
- 4-27 T8A08 (B)
- 4-28 T8B10 (C)
- 4-29 T8C09 (D)
- 4-30 T8D05 (A)
- 4-31 T9A10 (C)
- 4-32 T9B05 (D)
- 4-33 T0A09 (C)
- 4-34 T0B09 (C)
- 4-35 T0C08 (A)

5-1 T1A09 Who selects a Frequency Coordinator?

- A. The FCC Office of Spectrum Management and Coordination Policy
- B. The local chapter of the Office of National Council of Independent Frequency Coordinators
- C. Amateur operators in a local or regional area whose stations are eligible to be repeater or auxiliary stations
- D. FCC Regional Field Office

5-2 T1B01 What is the International Telecommunications Union (ITU)?

- A. An agency of the United States Department of Telecommunications Management
- B. A United Nations agency for information and communication technology issues
- C. An independent frequency coordination agency
- D. A department of the FCC

5-3 T1C09 What is the grace period following the expiration of an amateur license within which the license may be renewed?

- A. Two years
- B. Three years
- C. Five years
- D. Ten years

5-4 T1D11 When may an amateur station transmit without on-the-air identification?

- A. When the transmissions are of a brief nature to make station adjustments
- B. When the transmissions are unmodulated
- C. When the transmitted power level is below 1 watt
- D. When transmitting signals to control model craft

5-5 T1E10 Which of the following is an example of remote control as defined in Part 97?

- A. Repeater operation
- B. Operating the station over the internet
- C. Controlling a model aircraft, boat, or car by amateur radio
- D. All of these choices are correct

5-6 T1F11 Which of the following is a requirement for the issuance of a club station license grant?

- A. The trustee must have an Amateur Extra class operator license grant
- B. The club must have at least four members
- C. The club must be registered with the American Radio Relay League
- D. All of these choices are correct

5-7 T2A10 What is a band plan, beyond the privileges established by the FCC?

- A. A voluntary guideline for using different modes or activities within an amateur band
- B. A mandated list of operating schedules
- C. A list of scheduled net frequencies
- D. A plan devised by a club to indicate frequency band usage

5-8 T2B13 Where may SSB phone be used in amateur bands above 50 MHz?

- A. Only in sub-bands allocated to General class or higher licensees
- B. Only on repeaters
- C. In at least some portion of all these bands
- D. On any band as long as power is limited to 25 watts

5-9 T2C10 What information is contained in the preamble of a formal traffic message?

- A. The email address of the originating station
- B. The address of the intended recipient
- C. The telephone number of the addressee
- D. The information needed to track the message

5-10 T3A11 Which part of the atmosphere enables the propagation of radio signals around the world?

- A. The stratosphere
- B. The troposphere
- C. The ionosphere
- D. The magnetosphere

5-11 T3B07 What property of radio waves is often used to identify the different frequency bands?

- A. The approximate wavelength
- B. The magnetic intensity of waves
- C. The time it takes for waves to travel one mile
- D. The voltage standing wave ratio of waves

5-12 T3C08 What causes tropospheric ducting?

- A. Discharges of lightning during electrical storms
- B. Sunspots and solar flares
- C. Updrafts from hurricanes and tornadoes
- D. Temperature inversions in the atmosphere

5-13 T4A10 What is the source of a high-pitched whine that varies with engine speed in a mobile transceiver's receive audio?

- A. The ignition system
- B. The alternator
- C. The electric fuel pump
- D. Anti-lock braking system controllers

5-14 T4B12 Which of the following could be used to remove power line noise or ignition noise?

- A. Squelch
- B. Noise blanker
- C. Notch filter
- D. All of these choices are correct

5-15 T5A11 What is the unit of electromotive force?

- A. The volt
- B. The watt
- C. The ampere
- D. The ohm

5-16 T5B10 What is the approximate amount of change, measured in decibels (dB), of a power decrease from 12 watts to 3 watts?

- A. -1 dB
- B. -3 dB
- C. -6 dB
- D. -9 dB

5-17 T5C11 How many amperes are flowing in a circuit when the applied voltage is 12 volts DC and the load is 120 watts?

- A. 0.1 amperes
- B. 10 amperes
- C. 12 amperes
- D. 132 amperes

5-18 T5D09 What is the current through a 24-ohm resistor connected across 240 volts?

- A. 24,000 amperes
- B. 0.1 amperes
- C. 10 amperes
- D. 216 amperes

5-19 T6A10 Which of the following battery types is rechargeable?

- A. Nickel-metal hydride
- B. Lithium-ion
- C. Lead-acid gel-cell
- D. All of these choices are correct

5-20 T6B07 What does the abbreviation LED stand for?

- A. Low Emission Diode
- B. Light Emitting Diode
- C. Liquid Emission Detector
- D. Long Echo Delay

5-21 T6C13 Which of the following is accurately represented in electrical schematics?

- A. Wire lengths
- B. Physical appearance of components
- C. The way components are interconnected
- D. All of these choices are correct

5-22 T6D12 Which of the following is a common reason to use shielded wire?

- A. To decrease the resistance of DC power connections
- B. To increase the current carrying capability of the wire
- C. To prevent coupling of unwanted signals to or from the wire
- D. To couple the wire to other signals

5-23 T7A11 Where is an RF preamplifier installed?

- A. Between the antenna and receiver
- B. At the output of the transmitter's power amplifier
- C. Between a transmitter and antenna tuner
- D. At the receiver's audio output

5-24 T7B10 What might be a problem if you receive a report that your audio signal through the repeater is distorted or unintelligible?

- A. Your transmitter is slightly off frequency
- B. Your batteries are running low
- C. You are in a bad location
- D. All of these choices are correct

5-25 T7C11 What is a disadvantage of air core coaxial cable when compared to foam or solid dielectric types?

- A. It has more loss per foot
- B. It cannot be used for VHF or UHF antennas
- C. It requires special techniques to prevent water absorption
- D. It cannot be used at below freezing temperatures

5-26 T7D12 Which of the following precautions should be taken when measuring high voltages with a volt meter?

- A. Ensure that the voltmeter has very low impedance
- B. Ensure that the voltmeter and leads are rated for use at the voltages to be measured
- C. Ensure that the circuit is grounded through the voltmeter
- D. Ensure that the voltmeter is set to the correct frequency

5-27 T8A10 What is the typical bandwidth of analog fast-scan TV transmissions on the 70 centimeter band?

- A. More than 10 MHz
- B. About 6 MHz
- C. About 3 MHz
- D. About 1 MHz

5-28 T8B11 Who may receive telemetry from a space station?

- A. Anyone who can receive the telemetry signal
- B. A licensed radio amateur with a transmitter equipped for interrogating the satellite
- C. A licensed radio amateur who has been certified by the protocol developer
- D. A licensed radio amateur who has registered for an access code from AMSAT

5-29 T8C07 What is meant by Voice Over Internet Protocol (VoIP) as used in amateur radio?

- A. A set of rules specifying how to identify your station when linked over the internet to another station
- B. A set of guidelines for contacting DX stations during contests using internet access
- C. A technique for measuring the modulation quality of a transmitter using remote sites monitored via the internet
- D. A method of delivering voice communications over the internet using digital techniques

5-30 T8D11 What is an ARQ transmission system?

- A. A special transmission format limited to video signals
- B. A system used to encrypt command signals to an amateur radio satellite
- C. A digital scheme whereby the receiving station detects errors and sends a request to the sending station to retransmit the information
- D. A method of compressing the data in a message so more information can be sent in a shorter time

5-31 T9A12 What is an advantage of using a properly mounted 5/8 wavelength antenna for VHF or UHF mobile service?

- A. It has a lower radiation angle and more gain than a 1/4 wavelength antenna
- B. It has very high angle radiation for better communicating through a repeater
- C. It eliminates distortion caused by reflected signals
- D. It has 10 times the power gain of a 1/4 wavelength design

5-32 T9B06 Which of the following connectors is most suitable for frequencies above 400 MHz?

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

5-33 T0A06 What is a good way to guard against electrical shock at your station?

- A. Use three-wire cords and plugs for all AC powered equipment
- B. Connect all AC powered station equipment to a common safety ground
- C. Use a circuit protected by a ground-fault interrupter
- D. All of these choices are correct

5-34 T0B12 Which of the following is good practice when installing ground wires on a tower for lightning protection?

- A. Put a loop in the ground connection to prevent water damage to the ground system
- B. Make sure that all bends in the ground wires are clean, right-angle bends
- C. Ensure that connections are short and direct
- D. All of these choices are correct

5-35 T0C13 If the averaging time for exposure is 6 minutes, how much power density is permitted if the signal is present for 3 minutes and absent for 3 minutes rather than being present for the entire 6 minutes?

- A. 3 times as much
- B. 1/2 as much
- C. 2 times as much
- D. There is no adjustment allowed for shorter exposure times

5-1 T1A09 (C) 5-19 T6A10 (D)
5-2 T1B01 (B) 5-20 T6B07 (B)
5-3 T1C09 (A) 5-21 T6C13 (C)
5-4 T1D11 (D) 5-22 T6D12 (C)
5-5 T1E10 (B) 5-23 T7A11 (A)
5-6 T1F11 (B) 5-24 T7B10 (D)
5-7 T2A10 (A) 5-25 T7C11 (C)
5-8 T2B13 (C) 5-26 T7D12 (B)
5-9 T2C10 (D) 5-27 T8A10 (B)
5-10 T3A11 (C) 5-28 T8B11 (A)
5-11 T3B07 (A) 5-29 T8C07 (D)
5-12 T3C08 (D) 5-30 T8D11 (C)
5-13 T4A10 (B) 5-31 T9A12 (A)
5-14 T4B12 (B) 5-32 T9B06 (B)
5-15 T5A11 (A) 5-33 T0A06 (D)
5-16 T5B10 (C) 5-34 T0B12 (C)
5-17 T5C11 (B) 5-35 T0C13 (C)
5-18 T5D09 (C)

Attached are 5 Technician quizzes good from July 1, 2018 to June 30, 2022.

Take a quiz. Grade a quiz. For those questions you got wrong, look up the question's T code in one of the below books and understand the what is the correct answer. Once you have completed one quiz, take the next quiz.

Study books, for use July 1, 2018 to June 30, 2022 may be available at your local library and at:

<http://www.arrl.org/studying-for-a-technician-license>

https://www.gordonwestradioschool.com/main/page_w5yi_training_resources.html

If you do not write or take notes in your book, please consider donating your study book to your local library to help others study for the Technician license test.

Find an Amateur Radio License Class: <http://www.arrl.org/find-an-amateur-radio-license-class>

Find an exam session: <http://www.arrl.org/find-an-amateur-radio-license-exam-session>

What to bring to an exam session: <http://www.arrl.org/what-to-bring-to-an-exam-session>

Ham-In-A-Day Study Session schedule.

At least 1 week before the class, the students MUST complete all 5 quizzes and bring the quizzes to the Study Session.

Class schedule

0800 - 0900 Quiz 1. 15 minutes for student to review quiz; 35 minutes for class discussion on quiz; 10 minute break

0900 - 1000 Quiz 2. Same format

1000 - 1100 Quiz 3. Same format

1100 - 1200 Quiz 4. Same format

1200 - 1300 Lunch and student reviews Quizzes 1 - 5

1300 - 1400 Review and Technician Exam.

2018 exam price is \$15 and allows student to take one version of exam. Exam retakes will cost an additional \$15. General and Extra exams may be offered based on availability of Extra class Volunteer Examiners.

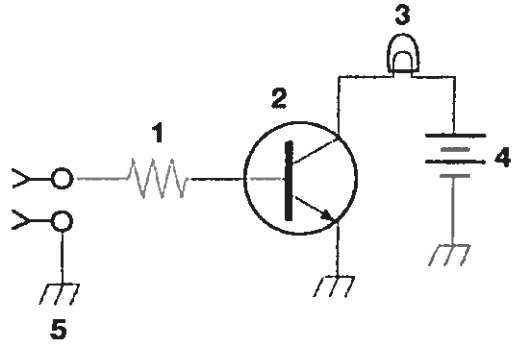


Figure T-1

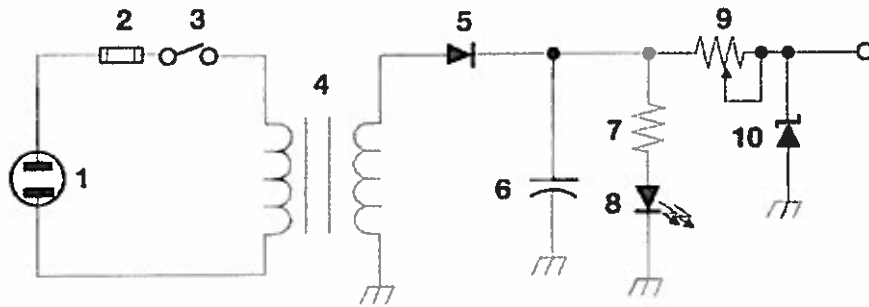


Figure T-2

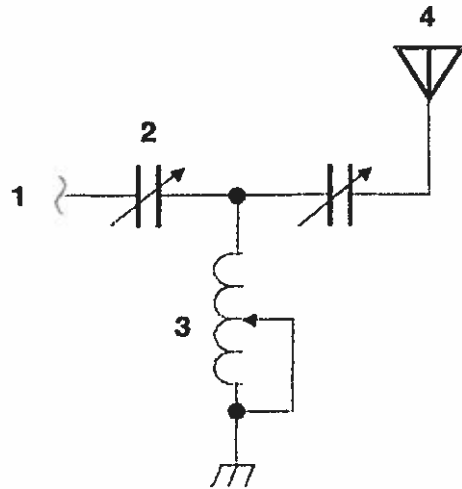


Figure T-3

US Amateur Radio Bands



The national association for
ARRL AMATEUR RADIO®

US AMATEUR POWER LIMITS

FCC 97.313 An amateur station must use the minimum transmitter power necessary to carry out the desired communications.
(b) No station may transmit with a transmitter power exceeding 1.5 kW PEP.

Amateurs wishing to operate on either 2,200 or 630 meters must first register with the Utilities Technology Council online at <https://utc.org/plc-database-amateur-notification-process/>. You need only register once for each band.

2,200 Meters (135 kHz)



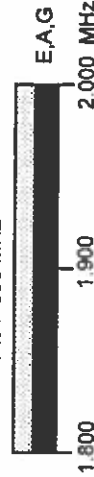
630 Meters (472 kHz)

5 W EIRP maximum, except in Alaska within 496 miles of Russia where the power limit is 1 W EIRP.



160 Meters (1.8 MHz)

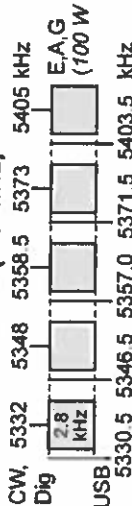
Avoid interference to radiolocation operations from 1.900 to 2.000 MHz



80 Meters (3.5 MHz)

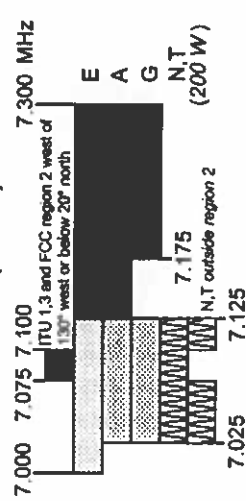


60 Meters (5.3 MHz)



General, Advanced, and Amateur Extra licensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.

40 Meters (7 MHz)



See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.

30 Meters (10.1 MHz)



Avoid interference to fixed services outside the US.

20 Meters (14 MHz)



17 Meters (18 MHz)



15 Meters (21 MHz)



12 Meters (24 MHz)



10 Meters (28 MHz)



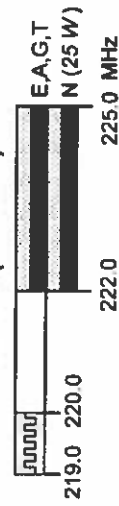
6 Meters (50 MHz)



2 Meters (144 MHz)



1.25 Meters (222 MHz)

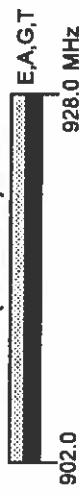


*Geographical and power restrictions may apply to all bands above 420 MHz. See The ARRL Operating Manual for information about your area.

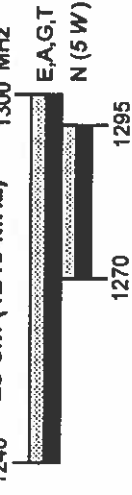
70 cm (420 MHz)*



33 cm (902 MHz)*



23 cm (1240 MHz)*



All licensees except Novices are authorized all modes on the following frequencies:

2300-2310 MHz	10.0-10.5 GHz †	122.25-123.0 GHz
2390-2450 MHz	24.0-24.25 GHz	134-141 GHz
3300-3500 MHz	47.0-47.2 GHz	241-250 GHz
5650-5825 MHz	78.0-81.0 GHz	All above 275 GHz

† No pulse emissions

KEY

Note: CW operation is permitted throughout all amateur bands.

MCW is authorized above 50.1 MHz, except for 144.0-144.1 and 219-220 MHz. Test transmissions are authorized above 51 MHz, except for 219-220 MHz

- = RTTY and data
- = phone and image
- = CW only
- = SSB phone
- = USB phone, CW, RTTY, and data.
- = Fixed digital message forwarding systems only

- E = Amateur Extra
- A = Advanced
- G = General
- T = Technician
- N = Novice

See ARRLWeb at www.arrl.org for detailed band plans.

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