

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

- 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

Why are simplex UHF signals rarely heard beyond their radio horizon? T3C01

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

Which instrument would you use to measure electric potential? T7D01

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

Which of the following can be used to enter a transceiver's operating frequency? T4B02

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

Which amateur band includes 146.52 MHz? T1B04

- A. 6 meters
- B. 20 meters
- C. 70 centimeters
- D. 2 meters

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

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

What are the units of electrical resistance? T5A04

- A. Siemens
- B. Mhos
- C. Ohms
- D. Coulombs

What is the national calling frequency for FM simplex operations in the 2 meter band? T2A02

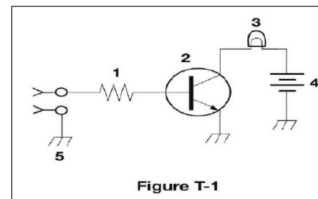
- A. 146.520 MHz
- B. 145.000 MHz
- C. 432.100 MHz
- D. 446.000 MH

Which term describes the ability of a receiver to detect the presence of a signal? T7A01

- A. Linearity
- B. Sensitivity
- C. Selectivity
- D. Total Harmonic Distortion

What is component 4 in figure T-1? (T6C05) A.

- A. Resistor
- B. Battery
- C. Transistor
- D. Ground symbol



What electrical component is typically constructed as a coil of wire? T6A07

- A. Switch
- B. Capacitor
- C. Diode
- D. Inductor

What is an advantage of a 5/8 wavelength whip antenna for VHF or UHF mobile service? T9A12

- 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

What proves that the FCC has issued an operator/primary license grant? T1A05

- A. A printed copy of the certificate of successful completion of examination
- B. An email notification from the NCVEC granting the license
- C. The license appears in the FCC ULS database
- D. All these choices are correct

How are the transceiver audio input and output connected in a station configured to operate using FT8?T4A04

- A. To a computer running a terminal program and connected to a terminal node controller unit
- B. To the audio input and output of a computer running WSJT-X software
- C. To an FT8 conversion unit, a keyboard, and a computer monitor
- D. To a computer connected to the FT8converter.com website

Which of the following is a source of loss in coaxial feed line? T9B08

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

What is the term that describes a device's ability to amplify a signal?T6B11

- A. Gain
- B. Forward resistance
- C. Forward voltage drop
- D. On resistance

What is a characteristic of HF communication compared with communications on VHF and higher frequencies? T3C02

- A. HF antennas are generally smaller
- B. HF accommodates wider bandwidth signals
- C. Long-distance ionospheric propagation is far more common on HF
- D. There is less atmospheric interference (static) on HF

What formula is used to calculate resistance in a circuit? T5D03

- A.  $R = E \times I$
- B.  $R = E / I$
- C.  $R = E + I$
- D.  $R = E - I$

For which license classes are new licenses currently available from the FCC?T1C01

- A. Novice, Technician, General, Amateur Extra
- B. Technician, Technician Plus, General, Amateur Extra
- C. Novice, Technician Plus, General, Advanced
- D. Technician, General, Amateur Extra

Which is equal to one kilovolt? T5B03

- A. One one-thousandth of a volt
- B. One hundred volts
- C. One thousand volts
- D. One million volts

When do FCC rules NOT apply to the operation of an amateur station?T2C01

- A. When operating a RACES station
- B. When operating under special FEMA rules
- C. **When operating under special ARES rules**
- D. FCC rules always apply

Which of the following actions should you take if a neighbor tells you that your station's transmissions are interfering with their radio or TV reception?T7B06

- A. **Make sure that your station is functioning properly and that it does not cause interference to your own radio or television when it is tuned to the same channel**
- B. Immediately turn off your transmitter and contact the nearest FCC office for assistance
- C. Install a harmonic doubler on the output of your transmitter and tune it until the interference is eliminated
- D. All these choices are correct

What is the relationship between wavelength and frequency?T3B05

- A. Wavelength gets longer as frequency increases
- B. **Wavelength gets shorter as frequency increases**
- C. Wavelength and frequency are unrelated
- D. Wavelength and frequency increase as path length increases

What is an amateur radio station that connects other amateur stations to the internet?T8C11

- A. **gateway**
- B. A repeater
- C. A digipeater
- D. A beacon

Why should a 5-ampere fuse never be replaced with a 20-ampere fuse? T0A05

- 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 these choices are correct

Which of the following devices or circuits changes an alternating current into a varying direct current signal?T6D01

- A. Transformer
- B. **Rectifier**
- C. Amplifier
- D. Reflecto

Why do most solid-state transmitters reduce output power as SWR increases beyond a certain level? T7C05

- A. To protect the output amplifier transistors
- B. To comply with FCC rules on spectral purity
- C. Because power supplies cannot supply enough current at high SWR
- D. To lower the SWR on the transmission line

What determines the transmitting frequency privileges of an amateur station? T1E04

- 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

At which of the following frequencies does maximum permissible exposure have the lowest value? T0C02

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

Which of the following are provided by satellite tracking programs? T8B03

- A. Maps showing the real-time position of the satellite track over Earth
- B. The time, azimuth, and elevation of the start, maximum altitude, and end of a pass
- C. The apparent frequency of the satellite transmission, including effects of Doppler shift
- D. All these choices are correct

With which countries are FCC-licensed amateur radio stations prohibited from exchanging communications? T1D01

- A. Any country whose administration has notified the International Telecommunication Union (ITU) that it objects to such communications
- B. Any country whose administration has notified the American Radio Relay League (ARRL) that it objects to such communications
- C. Any country banned from such communications by the International Amateur Radio Union (IARU)
- D. Any country banned from making such communications by the American Radio Relay League (ARRL)

What kind of data can be transmitted by APRS? T8D03

- A. GPS position data
- B. Text messages
- C. Weather data
- D. All these choices are correct

Which of the following is good practice when installing ground wires on a tower for lightning protection? T0B01

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

How much power is delivered by a voltage of 12 volts DC and a current of 2.5 amperes? T5C10

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

Which of the following results from the fact that signals propagated by the ionosphere are elliptically polarized? T3A09

- A. Digital modes are unusable
- B. Either vertically or horizontally polarized antennas may be used for transmission or reception
- C. FM voice is unusable
- D. Both the transmitting and receiving antennas must be of the same polarization

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- 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 propagated by the ionosphere
- D. UHF signals are absorbed by the ionospheric D region

What hazard is created by touching an antenna during a transmission? [T0C07] A.

- A. Electrocutation
- B. RF burn to skin
- C. Radiation poisoning
- D. All these choices are correct

What is component 8 in figure T-2? [T6C07]

- A. Resistor
- B. Inductor
- C. Regulator IC
- D. Light emitting diode

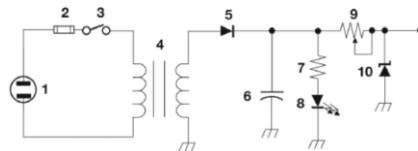


Figure T-2

What happens when antennas at opposite ends of a VHF or UHF line of sight radio link are not using the same polarization? [T3A04]

- A. The modulation sidebands might become inverted
- B. Received signal strength is reduced
- C. Signals have an echo effect
- D. Nothing significant will happen

Under what circumstances is it safe to climb a tower without a helper or observer? [T0B03] A.

When no electrical work is being performed

- B. When no mechanical work is being performed
- C. When the work being done is not more than 20 feet above the ground
- D. Never

Which is equal to 1,000,000 picofarads? [T5B08] A.

- .001 microfarads
- B. 1 microfarad
- C. 1000 microfarads
- D. 1,000,000,000 microfarads

How should you respond to a station calling CQ? [T2A05]

- A. Transmit "CQ" followed by the other station's call sign
- B. Transmit your call sign followed by the other station's call sign
- C. Transmit the other station's call sign followed by your call sign
- D. Transmit a signal report followed by your call sign

What is the electrical term for the force that causes electron flow? [T5A05] A.

- Voltage
- B. Ampere-hours
- C. Capacitance
- D. Inductance

What type of electrical component consists of conductive surfaces separated by an insulator? [T6A05]

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

Under which of the following circumstances are one-way transmissions by an amateur station prohibited? [T1D02]

- A. In all circumstances
- B. **Broadcasting**
- C. International Morse Code Practice
- D. Telecommand or transmissions of telemetry

Which of the following describes DMR? [T8D07]

- A. **A technique for time-multiplexing two digital voice signals on a single 12.5 kHz repeater channel**
- B. An automatic position tracking mode for FM mobiles communicating through repeaters
- C. An automatic computer logging technique for hands-off logging when communicating while operating a vehicle
- D. A digital technique for transmitting on two repeater inputs simultaneously for automatic error correction

What signals are used in a computer-radio interface for digital mode operation? [T4A06] A.

- Receive and transmit mode, status, and location
- B. Antenna and RF power
- C. **Receive audio, transmit audio, and transmitter keying**
- D. NMEA GPS location and DC power

What is the Amateur Radio Emergency Service (ARES)? [T2C06]

- A. **A group of licensed amateurs who have voluntarily registered their qualifications and equipment for communications duty in the public service**
- B. A group of licensed amateurs who are members of the military and who voluntarily agreed to provide message handling services in the case of an emergency
- C. A training program that provides licensing courses for those interested in obtaining an amateur license to use during emergencies
- D. A training program that certifies amateur operators for membership in the Radio Amateur Civil Emergency Service

What is the name of a circuit that generates a signal at a specific frequency? [T7A05]

- A. Reactance modulator
- B. Phase modulator
- C. Low-pass filter
- D. **Oscillator**

What are the names for the electrodes of a diode? [T6B09] A.

- Plus and minus
- B. Source and drain
- C. Anode and cathode
- D. Gate and base

Where should a fuse or circuit breaker be installed in a 120V AC power circuit? [T0A08] A.

- In series with the hot conductor only
- B. In series with the hot and neutral conductors
- C. In parallel with the hot conductor only
- D. In parallel with the hot and neutral conductors

Which of the following frequency ranges are available for phone operation by Technician licensees?[T1B01]

- A. 28.050 MHz to 28.150 MHz
- B. 28.100 MHz to 28.300 MHz
- C. 28.300 MHz to 28.500 MHz
- D. 28.500 MHz to 28.600 MHz

What type of circuit controls the amount of voltage from a power supply? [T6D05] A.

- Regulator
- B. Oscillator
- C. Filter
- D. Phase inverter

What is the approximate bandwidth of AM fast-scan TV transmissions? [T8A10] A.

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

Which of the following applies when two stations transmitting on the same frequency interfere with each other? [T2B08]

- The stations should negotiate continued use of the frequency
- B. Both stations should choose another frequency to avoid conflict
- C. Interference is inevitable, so no action is required
- D. Use subaudible tones so both stations can share the frequency

Which of the following are inputs to a satellite tracking program? [T8B06] A.

The satellite transmitted power

- B. The Keplerian elements
- C. The last observed time of zero Doppler shift
- D. All these choices are correct

Which of the following receiver filter bandwidths provides the best signal-to-noise ratio for SSB reception? [T4B10]

- A. 500 Hz
- B. 1000 Hz
- C. 2400 Hz
- D. 5000 Hz

What describes the ability to store energy in a magnetic field? [T5C03] A.

Admittance

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

When, under normal circumstances, may a Technician class licensee be the control operator of a station operating in an Amateur Extra Class band segment? [T1E06]

- A. At no time
- B. When designated as the control operator by an Amateur Extra Class licensee
- C. As part of a multi-operator contest team
- D. When using a club station whose trustee holds an Amateur Extra Class license

What happens to power lost in a feed line? [T7C07] A.

It increases the SWR

- B. It is radiated as harmonics
- C. It is converted into heat
- D. It distorts the signal

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

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

How is over the air access to IRLP nodes accomplished? [T8C06]

- 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

What property of a radio wave defines its polarization? [T3B02] A.

- A. The orientation of the electric field
- B. The orientation of the magnetic field
- C. The ratio of the energy in the magnetic field to the energy in the electric field
- D. The ratio of the velocity to the wavelength

What happens as the frequency of a signal in coaxial cable is increased? [T9B05] A.

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

What would cause a broadcast AM or FM radio to receive an amateur radio transmission unintentionally? [T7B02]

- 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

What language may you use for identification when operating in a phone sub-band? [T1F04] A.

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

When are you required to transmit your assigned call sign? [T1F03]

- 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

What is the current in a circuit with an applied voltage of 120 volts and a resistance of 80 ohms?  
[T5D07]

- A. 9600 amperes
- B. 200 amperes
- C. 0.667 amperes
- D. 1.5 amperes

Which agency regulates and enforces the rules for the Amateur Radio Service in the United States?  
[T1A02]

- A. FEMA
- B. Homeland Security
- C. The FCC
- D. All these choices are correct

Which of the following is a safety hazard of a 12-volt storage battery? [TOA01] 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 a nearby transmitter can cause the electrolyte to emit poison gas
- D. All these choices are correct

Who may select a desired call sign under the vanity call sign rules? [T1C02] 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

What are the two components of a radio wave? [T3B03]

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

What is the name of a device that combines several semiconductors and other components into one package? [T6D09]

- A. Transducer
- B. Multi-pole relay
- C. Integrated circuit
- D. Transformer

What is a common repeater frequency offset in the 70 cm band? [T2A03]

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

Which of the following is an important safety precaution to observe when putting up an antenna tower? [T0B04]

- A. Wear a ground strap connected to your wrist at all times
- B. Insulate the base of the tower to avoid lightning strikes
- C. Look for and stay clear of any overhead electrical wires
- D. All these choices are correct

What mode of transmission is commonly used by amateur radio satellites? [T8B04] A.

- A. SSB
- B. FM
- C. CW/data
- D. All these choices are correct

Which of the following types of antenna offers the greatest gain? [T9A06] A.

- A. 5/8 wave vertical
- B. Isotropic
- C. J pole
- D. Yagi

Which of the following types of propagation is most commonly associated with occasional strong signals on the 10, 6, and 2 meter bands from beyond the radio horizon? [T3C04]

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

What factors affect the RF exposure of people near an amateur station antenna? [T0C04] A.

- A. Frequency and power level of the RF field
- B. Distance from the antenna to a person
- C. Radiation pattern of the antenna
- D. All these choices are correct

How many operator/primary station license grants may be held by any one person? [T1A04]

- 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

When is it permissible to transmit messages encoded to obscure their meaning? [T1D03] A.

- A. Only during contests
- B. Only when transmitting certain approved digital codes
- C. Only when transmitting control commands to space stations or radio control craft
- D. Never

Which of the following is an appropriate power supply rating for a typical 50 watt output mobile FM transceiver? [T4A01]

- A. 24.0 volts at 4 amperes
- B. 13.8 volts at 4 amperes
- C. 24.0 volts at 12 amperes
- D. 13.8 volts at 12 amperes

. When may an amateur station transmit without a control operator? [T1E01] A.

- 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

Which of the following components can consist of three regions of semiconductor material? [T6B04]

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

Which of the following describes a linked repeater network? [T2B03]

- A. A network of repeaters in which signals received by one repeater are transmitted by all the repeaters in the network
- B. A single repeater with more than one receiver
- C. Multiple repeaters with the same control operator
- D. A system of repeaters linked by APRS

Which of the following is a form of amplitude modulation? T8A01

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

What formula is used to calculate voltage in a circuit? [T5D02] A.

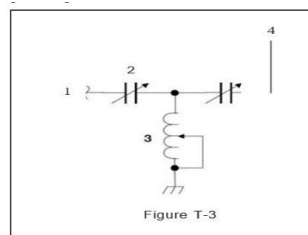
$E = I \times R$

- B.  $E = I / R$
- C.  $E = I + R$
- D.  $E = I - R$

What is component 4 in figure T-3? [T6C11] A.

Antenna

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



When must the station and its records be available for FCC inspection? [T1F01] A.

At any time ten days after notification by the FCC of such an inspection

- B. At any time upon request by an FCC representative
- C. At any time after written notification by the FCC of such inspection
- D. Only when presented with a valid warrant by an FCC official or government agent

Electrical current is measured in which of the following units? [T5A01] A.

Volts

- B. Watts
- C. Ohms
- D. Amperes

What antenna polarization is normally used for long-distance CW and SSB contacts on the VHF and UHF bands? [T3A03]

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

What electrical component opposes the flow of current in a DC circuit? [T6A01]

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

Which of the following is used to convert a signal from one frequency to another? [T7A03] A.

Phase splitter

- B. Mixer
- C. Inverter
- D. Amplifier

How many milliamperes is 1.5 amperes? [T5B01] A.

15 milliamperes

- B. 150 milliamperes
- C. 1500 milliamperes
- D. 15,000 milliamperes

Which of the following can cause radio frequency interference? [T7B03] A.

Fundamental overload

- B. Harmonics
- C. Spurious emissions
- D. All these choices are correct

How are US amateurs restricted in segments of bands where the Amateur Radio Service is secondary? [T1B08]

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

What technique is used to ensure that voice messages containing unusual words are received correctly? [T2C03]

- A. Send the words by voice and Morse code
- B. Speak very loudly into the microphone
- C. Spell the words using a standard phonetic alphabet
- D. All these choices are correct

What is Voice Over Internet Protocol (VoIP)? [T8C07]

- A. A set of rules specifying how to identify your station when linked over the internet to another station
- B. A technique employed to “spot” DX stations via the internet
- 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

What is the effect of excessive microphone gain on SSB transmissions? [T4B01] A.

Frequency instability

- B. Distorted transmitted audio
- C. Increased SWR
- D. All these choices are correct

What does an SWR reading of 4:1 indicate? [T7C06] A.

Loss of -4 Db

- B. Good impedance match
- C. Gain of +4 dB
- D. Impedance mismatch

Which of the following is a digital communications mode? [T8D01] A.

Packet radio

- B. IEEE 802.11
- C. FT8
- D. All these choices are correct

What is the unit of capacitance? [T5C02]

- A. The farad
- B. The ohm
- C. The volt
- D. The henry

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

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

Which of the following is true of PL-259 type coax connectors? [T9B07] A.

- 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

What is the FCC Part 97 definition of a beacon? [T1A06]

- A. A government transmitter marking the amateur radio band edges
- B. A bulletin sent by the FCC to announce a national emergency
- C. A continuous transmission of weather information authorized in the amateur bands by the National Weather Service
- D. An amateur station transmitting communications for the purposes of observing propagation or related experimental activities

Which decibel value most closely represents a power increase from 5 watts to 10 watts? [T5B09] A. 2

- A. dB
- B. 3 dB
- C. 5 dB
- D. 10 dB

What causes spin fading of satellite signals? [T8B09]

- 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

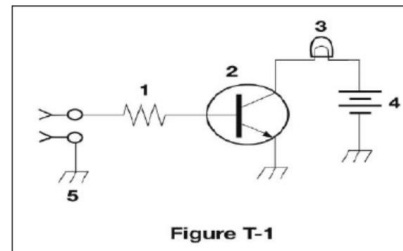
Which of the following are required for remote control operation? [T1E09]

- A. The control operator must be at the control point
- B. A control operator is required at all times
- C. The control operator must indirectly manipulate the controls
- D. **All these choices are correct**

What is component 1 in figure T-1? [T6C02] A.

**Resistor**

- B. Transistor
- C. Battery
- D. Connector



How is a VHF/UHF transceiver's "reverse" function used? [T2B01]

- A. To reduce power output
- B. To increase power output
- C. **To listen on a repeater's input frequency**
- D. To listen on a repeater's output frequency

Which of the following can result in revocation of the station license or suspension of the operator license? [T1C07]

- A. Failure to inform the FCC of any changes in the amateur station following performance of an RF safety environmental evaluation
- B. **Failure to provide and maintain a correct email address with the FCC**
- C. Failure to obtain FCC type acceptance prior to using a home-built transmitter
- D. Failure to have a copy of your license available at your station

Which instrument can be used to determine SWR? [T7C08] A.

- A. Voltmeter
- B. Ohmmeter
- C. Iambic pentameter
- D. **Directional wattmeter**

What can cause erratic changes in SWR? [T9B09]

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

What is the effect of vegetation on UHF and microwave signals? [T3A02] A.

Knife-edge diffraction

- B. Absorption
- C. Amplification
- D. Polarization rotation

What type of modulation is commonly used for VHF packet radio transmissions? [T8A02] A.

FM or PM

- B. SSB
- C. AM
- D. PSK

Which of the following actions can reduce exposure to RF radiation? [TOC08] A.

Relocate antennas

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

What term describes an amateur station that is transmitting and receiving on the same frequency?  
[T2A11]

- A. Full duplex
- B. Diplex
- C. Simplex
- D. Multiplex

How much current is required to deliver 120 watts at a voltage of 12 volts DC? [T5C11] A.

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

How is a voltmeter connected to a component to measure applied voltage? [T7D02]

- A. In series
- B. In parallel
- C. In quadrature
- D. In phase

Which frequency is in the 6 meter amateur band? [T1B03] A.

- 49.00 MHz
- B. 52.525 MHz
- C. 28.50 MHz
- D. 222.15 MHz

Electrical power is measured in which of the following units? [T5A02] A.

- Volts
- B. Watts
- C. Watt-hours
- D. Amperes

What health hazard is presented by electrical current flowing through the body? [T0A02] 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 these choices are correct

What is the Internet Radio Linking Project (IRLP)? [T8C08]

- A. A technique to connect amateur radio systems, such as repeaters, via the internet using Voice Over Internet Protocol (VoIP)
- B. A system for providing access to websites via amateur radio
- C. A system for informing amateurs in real time of the frequency of active DX stations
- D. A technique for measuring signal strength of an amateur transmitter via the internet

What formula is used to calculate current in a circuit? [T5D01] A. I

- = E R
- B.  $I = E / R$
- C.  $I = E + R$
- D.  $I = E - R$

What is an ARQ transmission system? [T8D11]

- A. A special transmission format limited to video signals
- B. A system used to encrypt command signals to an amateur radio satellite
- C. An error correction method in which the receiving station detects errors and sends a request for retransmission
- D. A method of compressing data using autonomous reiterative Q codes prior to final encoding

What electrical component is used to protect other circuit components from current overloads?  
[T6A09]

- A. Fuse
- B. Thyatron
- C. Varactor
- D. All these choices are correct

In addition to frequency, which of the following is used to identify amateur radio bands? [T3B07] A.

- A. The approximate wavelength in meters
- B. Traditional letter/number designators
- C. Channel numbers
- D. All these choices are correct

Which of the following describes a type of antenna loading? [T9A02]

- 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

What is an electronic keyer? [T4A12]

- A. A device for switching antennas from transmit to receive
- B. A device for voice activated switching from receive to transmit
- C. A device that assists in manual sending of Morse code
- D. An interlock to prevent unauthorized use of a radio

Which is a proper grounding method for a tower? [T0B08]

- 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. A connection between the tower base and a cold water pipe
- D. Separate eight-foot ground rods for each tower leg, bonded to the tower and each other

Which of the following is a reason to use shielded wire? [T6D03]

- 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

How does the FCC define broadcasting for the Amateur Radio Service? [T1D10] A.

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

Which of the following controls could be used if the voice pitch of a single-sideband signal returning to your CQ call seems too high or low? [T4B06]

- A. The AGC or limiter
- B. The bandwidth selection
- C. The tone squelch
- D. The RIT or Clarifier

What is RACES? [T2C04]

- A. An emergency organization combining amateur radio and citizens band operators and Frequencies
- B. An international radio experimentation society
- C. A radio contest held in a short period, sometimes called a "sprint"
- D. An FCC part 97 amateur radio service for civil defense communications during national Emergencies

What is a transceiver? [T7A02]

- A. A device that combines a receiver and transmitter
- B. A device for matching feedline impedance to 50 ohms
- C. A device for automatically sending and decoding Morse code
- D. A device for converting receiver and transmitter frequencies to another band

What causes tropospheric ducting? [T3C08]

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

Which of the following could you use to cure distorted audio caused by RF current on the shield of a microphone cable? [T7B04]

- A. Band-pass filter
- B. Low-pass filter
- C. Preamplifier
- D. Ferrite choke

Which of the following self-assigned indicators are acceptable when using a phone transmission? [T1F06]

- A. KL7CC stroke W3
- B. KL7CC slant W3
- C. KL7CC slash W3
- D. All these choices are correct

Which is true about forward voltage drop in a diode? [T6B01] A.

- A. It is lower in some diode types than in others
- B. It is proportional to peak inverse voltage
- C. It indicates that the diode is defective
- D. It has no impact on the voltage delivered to the load

What is the maximum peak envelope power output for Technician class operators in their HF band segments? [T1B11]

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

What is the most common impedance of coaxial cables used in amateur radio? [T9B02] A.

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

Which of the following battery chemistries is not rechargeable? [T6A11]

- A. Nickel-cadmium
- B. Carbon-zinc
- C. Lead-acid
- D. Lithium-ion

What is a satellite beacon? [T8B05]

- 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

What is the approximate velocity of a radio wave in free space? [T3B11] A.

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

Which of the following can damage a multimeter? [T7D06]

- A. Attempting to measure resistance using the voltage setting
- B. Failing to connect one of the probes to ground
- C. Attempting to measure voltage when using the resistance setting
- D. Not allowing it to warm up properly

In the United States, what circuit does black wire insulation indicate in a three-wire 120 V cable?  
[T0A03]

- A. Neutral
- B. Hot
- C. Equipment ground
- D. Black insulation is never used

How much power is delivered by a voltage of 13.8 volts DC and a current of 10 amperes? [T5C09] A.

- A. 138 watts
- B. 0.7 watts
- C. 23.8 watts
- D. 3.8 watts

What effect does multi-path propagation have on data transmissions? [T3A10]

- A. Transmission rates must 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**

What is the normal term for an FCC-issued amateur radio license? [T1C08] A.

- A. Five years
- B. Life
- C. **Ten years**
- D. Eight years

Which of the following can reduce overload of a VHF transceiver by a nearby commercial FM station? [T7B07]

- A. Installing an RF preamplifier
- B. Using double-shielded coaxial cable
- C. Installing bypass capacitors on the microphone cable
- D. **Installing a band-reject filter**

Who must designate the station control operator? [T1E03] A.

- A. **The station licensee**
- B. The FCC
- C. The frequency coordinator
- D. Any licensed operator

What is the resistance of a circuit that draws 4 amperes from a 12-volt source? [T5D06] A. **3**

- A. **ohms**
- B. 16 ohms
- C. 48 ohms
- D. 8 ohms

What is the purpose of a safety wire through a turnbuckle used to tension guy lines? [T0B05] A.

- A. Secure the guy line if the turnbuckle breaks
- B. **Prevent loosening of the turnbuckle from vibration**
- C. Provide a ground path for lightning strikes
- D. Provide an ability to measure for proper tensioning

Which of the following can provide power gain? [T6B10]

- A. Transformer
- B. Transistor
- C. Reactor
- D. Resistor

Which of the following describes alternating current? [T5A09]

- A. Current that alternates between a positive direction and zero
- B. Current that alternates between a negative direction and zero
- C. Current that alternates between positive and negative directions
- D. All these answers are correct

In which direction does a half-wave dipole antenna radiate the strongest signal? [T9A10] A.

- 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

Which agency regulates and enforces the rules for the Amateur Radio Service in the United States? [T1A02]

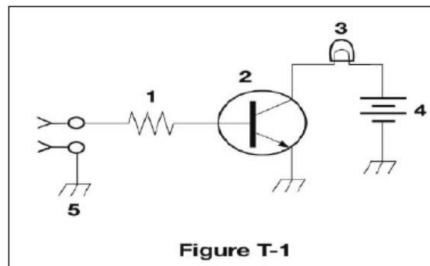
- A. FEMA
- B. Homeland Security
- C. The FCC
- D. All these choices are correct

What does a dummy load consist of? [T7C03] A.

- A. A high-gain amplifier and a TR switch
- B. A non-inductive resistor mounted on a heat sink
- C. A low-voltage power supply and a DC relay
- D. A 50-ohm reactance used to terminate a transmission line

What is component 3 in figure T-1? [T6C04] A.

- A. Resistor
- B. Transistor
- C. Lamp
- D. Ground symbol



Why is duty cycle one of the factors used to determine safe RF radiation exposure levels? [T0C10]

- A. It affects the average exposure to radiation
- B. It affects the peak exposure to radiation
- C. It takes into account the antenna feed line loss
- D. It takes into account the thermal effects of the final amplifier

When may amateur radio operators use their stations to notify other amateurs of the availability of equipment for sale or trade? [T1D05]

- A. Never
- B. When the equipment is not the personal property of either the station licensee, or the control operator, or their close relatives
- C. When no profit is made on the sale
- D. When selling amateur radio equipment and not on a regular basis

What component changes 120 V AC power to a lower AC voltage for other uses? [T6D06] A.

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

What device converts the RF input and output of a transceiver to another band? [T7A06] A.

- High-pass filter
- B. Low-pass filter
- C. Transverter
- D. Phase converter

What is a band plan, beyond the privileges established by the FCC? [T2A10]

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

Which of the following operating activities is supported by digital mode software in the WSJT-X software suite? [T8D10]

- A. Earth-Moon-Earth
- B. Weak signal propagation beacons
- C. Meteor scatter
- D. All these choices are correct

What is a way to enable quick access to a favorite frequency or channel on your transceiver? [T4B04]

- A. Enable the frequency offset
- B. Store it in a memory channel
- C. Enable the VOX
- D. Use the scan mode to select the desired frequency

What is required before using the EchoLink system? [T8C10] A.

- A. Complete the required EchoLink training
- B. Purchase a license to use the EchoLink software
- C. Register your call sign and provide proof of license
- D. All these choices are correct

Which is equal to 3.525 MHz? [T5B07] A.

- A. 0.003525 kHz
- B. 35.25 kHz
- C. 3525 kHz
- D. 3,525,000 kHz

What is the definition of third party communications? [T1F08]

- A. A message from a control operator to another amateur station control operator on behalf of another person
- B. Amateur radio communications where three stations are in communications with one another
- C. Operation when the transmitting equipment is licensed to a person other than the control operator
- D. Temporary authorization for an unlicensed person to transmit on the amateur bands for technical experiments

What is the approximate bandwidth of a VHF repeater FM voice signal? [T8A09]

- A. Less than 500 Hz
- B. About 150 kHz
- C. Between 10 and 15 kHz
- D. Between 50 and 125 kHz

Which of the following effects may allow radio signals to travel beyond obstructions between the transmitting and receiving stations? [T3C05]

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

Which Q signal indicates that you are changing frequency? [T2B11] A.

- QRU
- B. QSY
- C. QSL
- D. QRZ

Why are short, heavy-gauge wires used for a transceiver's DC power connection? [T4A03]

- A. To minimize voltage drop when transmitting
- B. To provide a good counterpoise for the antenna
- C. To avoid RF interference
- D. All these choices are correct

What does the term "traffic" refer to in net operation? [T2C05]

- A. 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

What is the name for the flow of electrons in an electric circuit? [T5A03]

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

What is the primary purpose of a dummy load? [T7C01]

- 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

Which of the following is a requirement for the issuance of a club station license grant? [T1F11]

- 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 these choices are correct

What weather condition might decrease range at microwave frequencies? [T3A07]

- A. High winds
- B. Low barometric pressure
- C. Precipitation
- D. Colder temperatures

What is the resistance of a circuit for which the applied voltage is 12 volts and the current flow is 1.5 amperes? [T5D05]

- A. 18 ohms
- B. 0.125 ohms
- C. 8 ohms
- D. 13.5 ohms

What is the major function of an antenna tuner (antenna coupler)? [T9B04]

- 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

What is required when climbing an antenna tower?  
[TOB02]

- A. Have sufficient training on safe tower climbing techniques
- B. Use appropriate tie-off to the tower at all times
- C. Always wear an approved climbing harness
- D. All these choices are correct

What is the definition of duty cycle during the averaging time for RF exposure? [T0C11]

- A. The difference between the lowest power output and the highest power output of a Transmitter
- B. The difference between the PEP and average power output of a transmitter
- C. The percentage of time that a transmitter is transmitting
- D. The percentage of time that a transmitter is not transmitting

What is component 6 in figure T-2? [T6C06]

- A. Resistor
- B. Capacitor
- C. Regulator IC
- D. Transistor

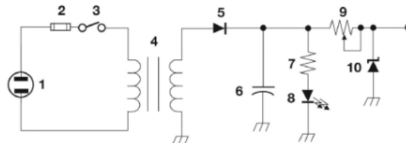


Figure T-2

When may amateur stations transmit information in support of broadcasting, program production, or news gathering, assuming no other means is available? [T1D09]

- A. When such communications are directly related to the immediate safety of human life or protection of property
- B. When broadcasting communications to or from the space shuttle
- C. Where noncommercial programming is gathered and supplied exclusively to the National Public Radio network
- D. D.Never

What are the names of the electrodes of a bipolar junction transistor? [T6B12]

- A. Signal, bias, power
- B. Emitter, base, collector
- C. Input, output, supply
- D. Pole one, pole two, output

Which of the following should be considered when selecting an accessory SWR meter? [T4A02]

- A. The frequency and power level at which the measurements will be made
- B. The distance that the meter will be located from the antenna
- C. The types of modulation being used at the station
- D. All these choices are correct

Which of the following are typical duties of a Net Control Station? [T2C02]

- A. Choose the regular net meeting time and frequency
- B. Ensure that all stations checking into the net are properly licensed for operation on the net Frequency
- C. Call the net to order and direct communications between stations checking in
- D. All these choices are correct

What is a relay? [T6D02]

- A. An electrically-controlled switch
- B. A current controlled amplifier
- C. An inverting amplifier
- D. A pass transistor

What does the scanning function of an FM transceiver do? [T4B05]

- A. Checks incoming signal deviation
- B. Prevents interference to nearby repeaters
- C. Tunes through a range of frequencies to check for activity
- D. Checks for messages left on a digital bulletin board

Who may be the control operator of a station communicating through an amateur satellite or space station? [T1E02]

- A. Only an Amateur Extra Class operator
- B. A General class or higher licensee with a satellite operator certification
- C. Only an Amateur Extra Class operator who is also an AMSAT member
- D. Any amateur allowed to transmit on the satellite uplink frequency

What is a grid locator? [T8C05]

- A. A letter-number designator assigned to a geographic location
- B. A letter-number designator assigned to an azimuth and elevation
- C. An instrument for neutralizing a final amplifier
- D. An instrument for radio direction finding

Which of the following is accurately represented in electrical schematics? [T6C12]

- A. Wire lengths
- B. Physical appearance of components
- C. Component connections
- D. All these choices are correct

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

- 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

What is a common repeater frequency offset in the 2 meter band? [T2A01]

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

What is the relationship between the electric and magnetic fields of an electromagnetic wave? [T3B01]

- A. They travel at different speeds
- B. They are in parallel
- C. They revolve in opposite directions
- D. They are at right angles

What is the formula used to calculate electrical power (P) in a DC circuit? [T5C08]

- A.  $P = I \times E$
- B.  $P = E / I$
- C.  $P = E - I$
- D.  $P = I + E$

What is the FCC Part 97 definition of a space station?

[T1A07]

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

What is the approximate bandwidth of a typical single sideband (SSB) voice signal? [T8A08]

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

Which of the following could be the reason you are unable to access a repeater whose output you can hear? [T2B04]

- A. Improper transceiver offset
- B. You are using the wrong CTCSS tone
- C. You are using the wrong DCS code
- D. All these choices are correct

Which of the following describes a simple dipole oriented parallel to Earth's surface? [T9A03]

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

If your license has expired and is still within the allowable grace period, may you continue to transmit on the amateur radio bands? [T1C11]

- A. Yes, for up to two years
- B. Yes, as soon as you apply for renewal
- C. Yes, for up to one year
- D. No, you must wait until the license has been renewed

What is the purpose of a fuse in an electrical circuit?

[TOA04]

- A. To prevent power supply ripple from damaging a component
- B. To remove power in case of overload
- C. To limit current to prevent shocks
- D. All these choices are correct

Which decibel value most closely represents a power decrease from 12 watts to 3 watts? [T5B10]

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

Where is an RF preamplifier installed? [T7A11]

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

Which of the following is an application of APRS? [T8D05]

- 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

What is a characteristic of VHF signals received via auroral backscatter? [T3C03]

- A. They are often received from 10,000 miles or more
- B. They are distorted and signal strength varies considerably
- C. They occur only during winter nighttime hours
- D. They are generally strongest when your antenna is aimed west

What telemetry information is typically transmitted by satellite beacons? [T8B01]

- A. The signal strength of received signals
- B. Time of day accurate to plus or minus 1/10 second
- C. Health and status of the satellite
- D. All these choices are correct

How may amateurs use the 219 to 220 MHz segment of 1.25 meter band? [T1B05]

- A. Spread spectrum only
- B. Fast-scan television only
- C. Emergency traffic only
- D. Fixed digital message forwarding systems only

When configured to measure current, how is a multimeter connected to a component? [T7D03]

- A. In series
- B. In parallel
- C. In quadrature
- D. In phase

