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\* The questions contained within this pool must be used in all Technician examinations beginning April 15, 2000, and is intended to be used up through June 30, 2003.

\* The correct answer position A,B,C,D appears in parenthesis following each question number [eg, in T1A01 (B), position B contains the correct answer text].

Question Pool  
ELEMENT 2 - TECHNICIAN CLASS  
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SUBELEMENT T1 -- COMMISSION'S RULES [9 Exam Questions -- 9 Groups]

T1A Basis and purpose of amateur service and definitions; Station /Operator license; classes of US amateur licenses, including basic differences; privileges of the various license classes; term of licenses; grace periods; modifications of licenses; current mailing address on file with FCC

T1A01 @N1A02 (B) [97]

Who makes and enforces the rules and regulations of the amateur service in the US?

- A. The Congress of the United States
- B. The Federal Communications Commission (FCC)
- C. The Volunteer Examiner Coordinators (VECs)
- D. The Federal Bureau of Investigation (FBI)

T1A02 @N1A06 (D) [97.1]

What are two of the five purposes for the amateur service?

- A. To protect historical radio data, and help the public understand radio history
- B. To help foreign countries improve communication and technical skills, and encourage visits from foreign hams
- C. To modernize radio schematic drawings, and increase the pool of electrical drafting people
- D. To increase the number of trained radio operators and electronics experts, and improve international goodwill

T1A03 @N1A09 (D) [97.3a5]

\*Modified C from Educational Review

What is the definition of an amateur station?

- A. A station in a public radio service used for radiocommunications

- B. A station using radiocommunications for a commercial purpose
- C. A station using equipment for training new broadcast operators and technicians
- D. A station in the Amateur Radio service used for radiocommunications

T1A04 @N1A10 (C) [97.3a12]

What is the definition of a control operator of an amateur station?

- A. Anyone who operates the controls of the station
- B. Anyone who is responsible for the station's equipment
- C. Any licensed amateur operator who is responsible for the station's transmissions
- D. The amateur operator with the highest class of license who is near the controls of the station

T1A05 @N1B03 (C) [97.5a]

\*Modified B for Form 605

Which of the following is required before you can operate an amateur station in the US?

- A. You must hold an FCC operator's training permit for a licensed radio station
- B. You must submit an FCC Form 605 together with a license examination fee
- C. The FCC must grant you an amateur operator/primary station license
- D. The FCC must issue you a Certificate of Successful Completion of Amateur Training

T1A06 @N1B06 (A) [97.9a]

What must happen before you are allowed to operate an amateur station?

- A. The FCC database must show that you have been granted an amateur license
- B. You must have written authorization from the FCC
- C. You must have written authorization from a Volunteer Examiner Coordinator
- D. You must have a copy of the FCC Rules, Part 97, at your station location

T1A07 @N1B10 (D) [97.9a]

\*Modified Q, A, B, C, D for Rules changes

What are the US amateur operator licenses that a new amateur might earn?

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

T1A08 @N1D12 (C) [97.5a]

How soon after you pass the elements required for your first Amateur Radio license may you transmit?

- A. Immediately
- B. 30 days after the test date
- C. As soon as the FCC grants you a license
- D. As soon as you receive your license from the FCC

T1A09 @N1D11 (A) [97.21a3i]

\*Modified Q for form 605 and ULS

How soon before the expiration date of your license should you send the FCC a completed Form 605 or file with the Universal Licensing System on the World Wide Web for a renewal?

- A. No more than 90 days
- B. No more than 30 days
- C. Within 6 to 9 months
- D. Within 6 months to a year

T1A10 @T1A10 (C) [97.25a]

What is the normal term for which a new amateur station license is granted?

- A. 5 years
- B. 7 years
- C. 10 years
- D. For the lifetime of the licensee

T1A11 @T1A11 (A) [97.21b]

What is the "grace period" during which the FCC will renew an expired 10-year license?

- A. 2 years
- B. 5 years
- C. 10 years
- D. There is no grace period

T1A12 @N1D06 (B) [97.23b]

What is one way you may notify the FCC if your mailing address changes?

- A. Fill out an FCC Form 605 using your new address, attach a copy of your license, and mail it to your local FCC Field Office
- B. Fill out an FCC Form 605 using your new address, attach a copy of your license, and mail it to the FCC office in Gettysburg, PA
- C. Call your local FCC Field Office and give them your new address over the phone or e-mail this information to the local Field Office
- D. Call the FCC office in Gettysburg, PA, and give them your new address over the phone or e-mail this information the FCC

T1B Frequency privileges authorized to the Technician control operator (VHF/UHF and HF)

T1B01 @New (B) [97.301a]

What are the frequency limits of the 6-meter band in ITU Region 2?

- A. 52.0 - 54.5 MHz
- B. 50.0 - 54.0 MHz
- C. 50.1 - 52.1 MHz
- D. 50.0 - 56.0 MHz

T1B02 @New (B) [97.301a]

What are the frequency limits of the 2-meter band in ITU Region 2?

- A. 145.0 - 150.5 MHz
- B. 144.0 - 148.0 MHz
- C. 144.1 - 146.5 MHz
- D. 144.0 - 146.0 MHz

T1B03 @N1C05 (B) [97.301f]

\*Modified Q for Rules changes (deleted Novice from Q)

What are the frequency limits of the 1.25-meter band in ITU Region 2?

- A. 225.0 - 230.5 MHz

- B. 222.0 - 225.0 MHz
- C. 224.1 - 225.1 MHz
- D. 220.0 - 226.0 MHz

T1B04 @New (C) [97.301a]

What are the frequency limits of the 70-centimeter band in ITU Region 2?

- A. 430.0 - 440.0 MHz
- B. 430.0 - 450.0 MHz
- C. 420.0 - 450.0 MHz
- D. 432.0 - 435.0 MHz

T1B05 @New (D) [97.301a]

What are the frequency limits of the 33-centimeter band in ITU Region 2?

- A. 903 - 927 MHz
- B. 905 - 925 MHz
- C. 900 - 930 MHz
- D. 902 - 928 MHz

T1B06 @N1C06 (B) [97.301a]

\*Modified Q answer key for Rules changes (deleted Novice from Q and changed answer key correct answer)

What are the frequency limits of the 23-centimeter band?

- A. 1260 - 1270 MHz
- B. 1240 - 1300 MHz
- C. 1270 - 1295 MHz
- D. 1240 - 1246 MHz

T1B07 @New (A) [97.301a]

What are the frequency limits of the 13-centimeter band in ITU Region 2?

- A. 2300 - 2310 MHz and 2390 - 2450 MHz
- B. 2300 - 2350 MHz and 2400 - 2450 MHz
- C. 2350 - 2380 MHz and 2390 - 2450 MHz
- D. 2300 - 2350 MHz and 2380 - 2450 MHz

T1B08 @N1C01 (B) [97.301e]

\*Modified Q for Rules changes

What are the frequency limits of the 80-meter band for Technician class licensees who have passed a Morse code exam?

- A. 3500 - 4000 kHz
- B. 3675 - 3725 kHz
- C. 7100 - 7150 kHz
- D. 7000 - 7300 kHz

T1B09 @N1C02 (C) [97.301e]

What are the frequency limits of the 40-meter band in ITU Region 2 for Technician class licensees who have passed a Morse code exam?

- A. 3500 - 4000 kHz
- B. 3700 - 3750 kHz
- C. 7100 - 7150 kHz
- D. 7000 - 7300 kHz

T1B10 @N1C03 (A) [97.301e]

What are the frequency limits of the 15-meter band for Technician class licensees who have passed a Morse code exam?

- A. 21.100 - 21.200 MHz
- B. 21.000 - 21.450 MHz
- C. 28.000 - 29.700 MHz
- D. 28.100 - 28.200 MHz

T1B11 @N1C04 (C) [97.301e]

What are the frequency limits of the 10-meter band for Technician class licensees who have passed a Morse code exam?

- A. 28.000 - 28.500 MHz
- B. 28.100 - 29.500 MHz
- C. 28.100 - 28.500 MHz
- D. 29.100 - 29.500 MHz

T1B12 @T1A09 (C) [97.9b]

\*Modified Q, C for Rules changes

If you are a Technician licensee who has passed a Morse code exam, what is one document you can use to prove that you are authorized to use certain amateur frequencies below 30 MHz?

- A. A certificate from the FCC showing that you have notified them that you will be using the HF bands
- B. A certificate showing that you have attended a class in HF communications
- C. A Certificate of Successful Completion of Examination showing that you have passed a Morse code exam
- D. No special proof is required

T1C Emission privileges authorized to the Technician control operator (VHF/UHF and HF)

T1C01 @T1B01 (D) [97.305c]

\*Modified Q for Rules changes

On what HF band may a Technician licensee use FM phone emission?

- A. 10 meters
- B. 15 meters
- C. 75 meters
- D. None

T1C02 @T1B03 (B) [97.305c]

On what frequencies within the 6-meter band may phone emissions be transmitted?

- A. 50.0 - 54.0 MHz only
- B. 50.1 - 54.0 MHz only
- C. 51.0 - 54.0 MHz only
- D. 52.0 - 54.0 MHz only

T1C03 @T1B04 (A) [97.305c]

On what frequencies within the 2-meter band may image emissions be transmitted?

- A. 144.1 - 148.0 MHz only
- B. 146.0 - 148.0 MHz only
- C. 144.0 - 148.0 MHz only
- D. 146.0 - 147.0 MHz only

T1C04 @T1B05 (D) [97.305c]

What frequencies within the 2-meter band are reserved exclusively for CW operations?

- A. 146 - 147 MHz

- B. 146.0 - 146.1 MHz
- C. 145 - 148 MHz
- D. 144.0 - 144.1 MHz

T1C05 @N1E01 (A) [97.305, 97.307f9]

\*Modified Q for Rules changes

What emission types are Technician control operators who have passed a Morse code exam allowed to use in the 80-meter band?

- A. CW only
- B. Data only
- C. RTTY only
- D. Phone only

T1C06 @N1E05 (D) [97.305, 97.307f9]

\*Modified Q for Rules changes

What emission types are Technician control operators who have passed a Morse code exam allowed to use from 7100 to 7150 kHz in ITU Region 2?

- A. CW and data
- B. Phone
- C. Data only
- D. CW only

T1C07 @N1E07 (C) [97.305]

\*Modified Q for Rules changes

What emission types are Technician control operators who have passed a Morse code exam allowed to use on frequencies from 28.1 to 28.3 MHz?

- A. All authorized amateur emission privileges
- B. Data or phone
- C. CW, RTTY and data
- D. CW and phone

T1C08 @N1E08 (C) [97.305, 97.307f10]

\*Modified Q for Rules changes

What emission types are Technician control operators who have passed a Morse code exam allowed to use on frequencies from 28.3 to 28.5 MHz?

- A. All authorized amateur emission privileges
- B. CW and data
- C. CW and single-sideband phone
- D. Data and phone

T1C09 @N1E09 (D) [97.305]

\*Modified Q for Rules changes

What emission types are Technician control operators allowed to use on the amateur 1.25-meter band in ITU Region 2?

- A. Only CW and phone
- B. Only CW and data
- C. Only data and phone
- D. All amateur emission privileges authorized for use on the band

T1C10 @N1E10 (D) [97.305]

\*Modified Q for Rules changes

What emission types are Technician control operators allowed to use on the amateur 23-centimeter band?

- A. Only data and phone
- B. Only CW and data
- C. Only CW and phone
- D. All amateur emission privileges authorized for use on the band

T1C11 @New (C) [97.305c]

On what frequencies within the 70-centimeter band in ITU Region 2 may image emissions be transmitted?

- A. 420.0 - 420.1 MHz only
- B. 430.0 - 440.0 MHz only
- C. 420.0 - 450.0 MHz only
- D. 440.0 - 450.0 MHz only

T1D Responsibility of licensee; station control; control operator requirements; station identification; points of communication and operation; business communications

T1D01 @T1A01 (D) [97.3a13]

What is the control point of an amateur station?

- A. The on/off switch of the transmitter
- B. The input/output port of a packet controller
- C. The variable frequency oscillator of a transmitter
- D. The location at which the control operator function is performed

T1D02 @N1G02 (C) [97.103a]

Who is responsible for the proper operation of an amateur station?

- A. Only the control operator
- B. Only the station licensee
- C. Both the control operator and the station licensee
- D. The person who owns the station equipment

T1D03 @N1G04 (D) [97.103a]

What is your responsibility as a station licensee?

- A. You must allow another amateur to operate your station upon request
- B. You must be present whenever the station is operated
- C. You must notify the FCC if another amateur acts as the control operator
- D. You are responsible for the proper operation of the station in accordance with the FCC rules

T1D04 @N1G05 (C) [97.103b]

Who may be the control operator of an amateur station?

- A. Any person over 21 years of age
- B. Any person over 21 years of age with a General class license or higher
- C. Any licensed amateur chosen by the station licensee
- D. Any licensed amateur with a Technician class license or higher

T1D05 @N1G08 (B) [97.105b]

If you are the control operator at the station of another amateur who has a higher class license than yours, what operating privileges are you allowed?

- A. Any privileges allowed by the higher license
- B. Only the privileges allowed by your license
- C. All the emission privileges of the higher license, but only the frequency privileges of your license
- D. All the frequency privileges of the higher license, but only the emission privileges of your license

T1D06 @N1G10 (A) [97.109b]

\*Modified Q for Rules changes

When an amateur station is transmitting, where must its control operator be?

- A. At the station's control point
- B. Anywhere in the same building as the transmitter
- C. At the station's entrance, to control entry to the room
- D. Anywhere within 50 km of the station location

T1D07 @N1H01 (C) [97.119a]

How often must an amateur station be identified?

- A. At the beginning of a contact and at least every ten minutes after that
- B. At least once during each transmission
- C. At least every ten minutes during and at the end of a contact
- D. At the beginning and end of each transmission

T1D08 @N1H03 (A) [97.119a]

What identification, if any, is required when two amateur stations begin communications?

- A. No identification is required
- B. One of the stations must give both stations' call signs
- C. Each station must transmit its own call sign
- D. Both stations must transmit both call signs

T1D09 @N1H04 (C) [97.119a]

What identification, if any, is required when two amateur stations end communications?

- A. No identification is required
- B. One of the stations must transmit both stations' call signs
- C. Each station must transmit its own call sign
- D. Both stations must transmit both call signs

T1D10 @N1H06 (B) [97.119a]

What is the longest period of time an amateur station can operate without transmitting its call sign?

- A. 5 minutes
- B. 10 minutes
- C. 15 minutes
- D. 30 minutes

T1D11 @T1C12 (A) [97.305a]

What emission type may always be used for station identification, regardless of the transmitting frequency?

- A. CW
- B. RTTY
- C. MCW
- D. Phone

T1D12 @T1C16 (C) [97.119e]

If you are a Technician licensee with a Certificate of Successful Completion of Examination (CSCE) for a Morse code exam, how should you identify your station when transmitting on the 10 meter band?

- A. You must give your call sign followed by the words "plus plus"
- B. You must give your call sign followed by the words "temporary plus"
- C. No special form of identification is needed
- D. You must give your call sign and the location of the VE

examination where you obtained the CSCE

T1E Third-party communication; authorized and prohibited transmissions; permissible one-way communication

T1E01 @T1E07 (D) [97.11a2]

What kind of payment is allowed for third-party messages sent by an amateur station?

- A. Any amount agreed upon in advance
- B. Donation of repairs to amateur equipment
- C. Donation of amateur equipment
- D. No payment of any kind is allowed

T1E02 @N1I08 (A) [97.3a44]

What is the definition of third-party communications?

- A. A message sent between two amateur stations for someone else
- B. Public service communications for a political party
- C. Any messages sent by amateur stations
- D. A three-minute transmission to another amateur

T1E03 @N1I09 (B) [97.3a44]

What is a "third party" in amateur communications?

- A. An amateur station that breaks in to talk
- B. A person who is sent a message by amateur communications other than a control operator who handles the message
- C. A shortwave listener who monitors amateur communications
- D. An unlicensed control operator

T1E04 @T1E08 (D) [97.115a2]

When are third-party messages allowed to be sent to a foreign country?

- A. When sent by agreement of both control operators
- B. When the third party speaks to a relative
- C. They are not allowed under any circumstances
- D. When the US has a third-party agreement with the foreign country or the third party is qualified to be a control operator

T1E05 @T1E09 (A) [97.115b1]

If you let an unlicensed third party use your amateur station, what must you do at your station's control point?

- A. You must continuously monitor and supervise the third-party's participation
- B. You must monitor and supervise the communication only if contacts are made in countries that have no third-party communications agreement with the US
- C. You must monitor and supervise the communication only if contacts are made on frequencies below 30 MHz
- D. You must key the transmitter and make the station identification

T1E06 @N1H05 (B) [97.115c]

Besides normal identification, what else must a US station do when sending third-party communications internationally?

- A. The US station must transmit its own call sign at the beginning of each communication, and at least every ten minutes after that
- B. The US station must transmit both call signs at the end of each communication
- C. The US station must transmit its own call sign at the beginning of each communication, and at least every five minutes after that

D. Each station must transmit its own call sign at the end of each transmission, and at least every five minutes after that

T1E07 @N1I05 (A) [97.113b]

When is an amateur allowed to broadcast information to the general public?

- A. Never
- B. Only when the operator is being paid
- C. Only when broadcasts last less than 1 hour
- D. Only when broadcasts last longer than 15 minutes

T1E08 @N1I06 (A) [97.113a4, 97.113e]

When is an amateur station permitted to transmit music?

- A. Never, except incidental music during authorized rebroadcasts of space shuttle communications
- B. Only if the transmitted music produces no spurious emissions
- C. Only if it is used to jam an illegal transmission
- D. Only if it is above 1280 MHz, and the music is a live performance

T1E09 @N1I07 (C) [97.113a4]

When is the use of codes or ciphers allowed to hide the meaning of an amateur message?

- A. Only during contests
- B. Only during nationally declared emergencies
- C. Never, except when special requirements are met
- D. Only on frequencies above 1280 MHz

T1E10 @T1E04 (B) [97.3a10, 97.113b]

Which of the following one-way communications may not be transmitted in the amateur service?

- A. Telecommands to model craft
- B. Broadcasts intended for the general public
- C. Brief transmissions to make adjustments to the station
- D. Morse code practice

T1E11 @N1I10 (A) [97.115a2]

If you are allowing a non-amateur friend to use your station to talk to someone in the US, and a foreign station breaks in to talk to your friend, what should you do?

- A. Have your friend wait until you find out if the US has a third-party agreement with the foreign station's government
- B. Stop all discussions and quickly sign off
- C. Since you can talk to any foreign amateurs, your friend may keep talking as long as you are the control operator
- D. Report the incident to the foreign amateur's government

T1E12 @N1I11 (D) [97.115a2]

When are you allowed to transmit a message to a station in a foreign country for a third party?

- A. Anytime
- B. Never
- C. Anytime, unless there is a third-party agreement between the US and the foreign government
- D. If there is a third-party agreement with the US government, or if the third party is eligible to be the control operator

T1F Frequency selection and sharing; transmitter power; digital

communications

T1F01 @T1B06 (C) [97.303]

If the FCC rules say that the amateur service is a secondary user of a frequency band, and another service is a primary user, what does this mean?

- A. Nothing special; all users of a frequency band have equal rights to operate
- B. Amateurs are only allowed to use the frequency band during emergencies
- C. Amateurs are allowed to use the frequency band only if they do not cause harmful interference to primary users
- D. Amateurs must increase transmitter power to overcome any interference caused by primary users

T1F02 @T1B08 (C) [97.101b]

What rule applies if two amateur stations want to use the same frequency?

- A. The station operator with a lesser class of license must yield the frequency to a higher-class licensee
- B. The station operator with a lower power output must yield the frequency to the station with a higher power output
- C. Both station operators have an equal right to operate on the frequency
- D. Station operators in ITU Regions 1 and 3 must yield the frequency to stations in ITU Region 2

T1F03 @T1B09 (A) [97.205c]

\*Modified Q from Educational Review

If a repeater is causing harmful interference to another repeater and a frequency coordinator has recommended the operation of one repeater only, who is responsible for resolving the interference?

- A. The licensee of the unrecommended repeater
- B. Both repeater licensees
- C. The licensee of the recommended repeater
- D. The frequency coordinator

T1F04 @T1B10 (D) [97.205c]

\*Modified Q from Educational Review

If a repeater is causing harmful interference to another amateur repeater and a frequency coordinator has recommended the operation of both repeaters, who is responsible for resolving the interference?

- A. The licensee of the repeater that has been recommended for the longest period of time
- B. The licensee of the repeater that has been recommended the most recently
- C. The frequency coordinator
- D. Both repeater licensees

T1F05 @T1B12 (D) [97.3b6]

What is the term for the average power supplied to an antenna transmission line during one RF cycle at the crest of the modulation envelope?

- A. Peak transmitter power
- B. Peak output power
- C. Average radio-frequency power
- D. Peak envelope power

T1F06 @T1B13 (D) [97.313b]

What is the maximum transmitting power permitted an amateur station on 146.52 MHz?

- A. 200 watts PEP output
- B. 500 watts ERP
- C. 1000 watts DC input
- D. 1500 watts PEP output

T1F07 @N1F09 (A) [97.313c]

\*Modified Q for Rules changes

On which band(s) may a Technician licensee who has passed a Morse code exam use up to 200 watts PEP output power?

- A. 80, 40, 15, and 10 meters
- B. 80, 40, 20, and 10 meters
- C. 1.25 meters
- D. 23 centimeters

T1F08 @N1F01 (D) [97.313a]

What amount of transmitter power must amateur stations use at all times?

- A. 25 watts PEP output
- B. 250 watts PEP output
- C. 1500 watts PEP output
- D. The minimum legal power necessary to communicate

T1F09 @N1F13 (C) [97.3c2]

What name does the FCC use for telemetry, telecommand or computer communications emissions?

- A. CW
- B. Image
- C. Data
- D. RTTY

T1F10 @N1F14 (D) [97.3c7]

What name does the FCC use for narrow-band direct-printing telegraphy emissions?

- A. CW
- B. Image
- C. MCW
- D. RTTY

T1F11 @T1C04 (C) [97.307f5]

What is the maximum symbol rate permitted for packet transmissions on the 2-meter band?

- A. 300 bauds
- B. 1200 bauds
- C. 19.6 kilobauds
- D. 56 kilobauds

T1F12 @T1C06 (B) [97.307f5]

What is the maximum symbol rate permitted for RTTY or data transmissions on the 6- and 2-meter bands?

- A. 56 kilobauds
- B. 19.6 kilobauds
- C. 1200 bauds
- D. 300 bauds

T1G Satellite and space communications; false signals or unidentified communications; malicious interference

T1G01 @N1I02 (C) [97.3a38]

\*Modified D to say International Space Station instead of space shuttles.

What is an amateur space station?

- A. An amateur station operated on an unused frequency
- B. An amateur station awaiting its new call letters from the FCC
- C. An amateur station located more than 50 kilometers above the Earth's surface
- D. An amateur station that communicates with the International Space Station

T1G02 @N1I03 (B) [97.207a]

Who may be the licensee of an amateur space station?

- A. An amateur holding an Amateur Extra class operator license
- B. Any licensed amateur operator
- C. Anyone designated by the commander of the spacecraft
- D. No one unless specifically authorized by the government

T1G03 @T1E05 (A) [97.209b2]

Which band may NOT be used by Earth stations for satellite communications?

- A. 6 meters
- B. 2 meters
- C. 70 centimeters
- D. 23 centimeters

T1G04 @N1J01 (A) [97.113a4]

When may false or deceptive amateur signals or communications be transmitted?

- A. Never
- B. When operating a beacon transmitter in a "fox hunt" exercise
- C. When playing a harmless "practical joke"
- D. When you need to hide the meaning of a message for secrecy

T1G05 @N1J02 (C) [97.113a4]

If an amateur pretends there is an emergency and transmits the word "MAYDAY," what is this called?

- A. A traditional greeting in May
- B. An emergency test transmission
- C. False or deceptive signals
- D. Nothing special; "MAYDAY" has no meaning in an emergency

T1G06 @N1J07 (C) [97.119a]

When may an amateur transmit unidentified communications?

- A. Only for brief tests not meant as messages
- B. Only if it does not interfere with others
- C. Never, except transmissions from a space station or to control a model craft
- D. Only for two-way or third-party communications

T1G07 @N1J08 (A) [97.119a]

What is an amateur communication called that does not have the required station identification?

- A. Unidentified communications or signals
- B. Reluctance modulation
- C. Test emission
- D. Tactical communication

T1G08 @N1J10 (C) [97.119a]

If an amateur transmits to test access to a repeater without giving any station identification, what type of communication is this called?

- A. A test emission; no identification is required
- B. An illegal unmodulated transmission
- C. An illegal unidentified transmission
- D. A non-communication; no voice is transmitted

T1G09 @N1J06 (C) [97.101d]

When may you deliberately interfere with another station's communications?

- A. Only if the station is operating illegally
- B. Only if the station begins transmitting on a frequency you are using
- C. Never
- D. You may expect, and cause, deliberate interference because it can't be helped during crowded band conditions

T1G10 @N1J11 (B) [97.3a22]

If an amateur repeatedly transmits on a frequency already occupied by a group of amateurs in a net operation, what type of interference is this called?

- A. Break-in interference
- B. Harmful or malicious interference
- C. Incidental interference
- D. Intermittent interference

T1G11 @N1J03 (B) [97.3a22]

What is a transmission called that disturbs other communications?

- A. Interrupted CW
- B. Harmful interference
- C. Transponder signals
- D. Unidentified transmissions

T1H Correct language; phonetics; beacons; radio control of model craft and vehicles

T1H01 @T1D01 (C) [97.119b2]

If you are using a language besides English to make a contact, what language must you use when identifying your station?

- A. The language being used for the contact
- B. The language being used for the contact, provided the US has a third-party communications agreement with that country
- C. English
- D. Any language of a country that is a member of the International Telecommunication Union

T1H02 @T1D03 (C) [97.119b2]

What do the FCC Rules suggest you use as an aid for correct station identification when using phone?

- A. A speech compressor
- B. Q signals

- C. A phonetic alphabet
- D. Unique words of your choice

T1H03 @T1D04 (A) [97.119b2]

What is the advantage in using the International Telecommunication Union (ITU) phonetic alphabet when identifying your station?

- A. The words are internationally recognized substitutes for letters
- B. There is no advantage
- C. The words have been chosen to be easily pronounced by Asian cultures
- D. It preserves traditions begun in the early days of Amateur Radio

T1H04 @T1D05 (A) [97.119b2]

What is one reason to avoid using "cute" phrases or word combinations to identify your station?

- A. They are not easily understood by non-English-speaking amateurs
- B. They might offend English-speaking amateurs
- C. They do not meet FCC identification requirements
- D. They might be interpreted as codes or ciphers intended to obscure the meaning of your identification

T1H05 @T1D06 (A) [97.3a9]

What is an amateur station called that transmits communications for the purpose of observation of propagation and reception?

- A. A beacon
- B. A repeater
- C. An auxiliary station
- D. A radio control station

T1H06 @T1D07 (B) [97.203c]

What is the maximum transmitting power permitted an amateur station in beacon operation?

- A. 10 watts PEP output
- B. 100 watts PEP output
- C. 500 watts PEP output
- D. 1500 watts PEP output

T1H07 @T1D08 (B) [97.205a]

\*Modified A for Rules changes

What minimum class of amateur license must you hold to operate a beacon or a repeater station?

- A. Technician with credit for passing a Morse code exam
- B. Technician
- C. General
- D. Amateur Extra

T1H08 @T1D09 (C) [97.215a]

What minimum information must be on a label affixed to a transmitter used for telecommand (control) of model craft?

- A. Station call sign
- B. Station call sign and the station licensee's name
- C. Station call sign and the station licensee's name and address
- D. Station call sign and the station licensee's class of license

T1H09 @T1D11 (B) [97.215c]

What is the maximum transmitter power an amateur station is allowed when used for telecommand (control) of model craft?

- A. One milliwatt
- B. One watt
- C. 25 watts
- D. 100 watts

T1I Emergency communications; broadcasting; indecent and obscene language

T1I01 @N1I12 (D) [97.405a]

If you hear a voice distress signal on a frequency outside of your license privileges, what are you allowed to do to help the station in distress?

- A. You are NOT allowed to help because the frequency of the signal is outside your privileges
- B. You are allowed to help only if you keep your signals within the nearest frequency band of your privileges
- C. You are allowed to help on a frequency outside your privileges only if you use international Morse code
- D. You are allowed to help on a frequency outside your privileges in any way possible

T1I02 @N1I13 (C) [97.403]

When may you use your amateur station to transmit an "SOS" or "MAYDAY"?

- A. Never
- B. Only at specific times (at 15 and 30 minutes after the hour)
- C. In a life- or property-threatening emergency
- D. When the National Weather Service has announced a severe weather watch

T1I03 @N1I14 (B) [97.405a]

When may you send a distress signal on any frequency?

- A. Never
- B. In a life- or property-threatening emergency
- C. Only at specific times (at 15 and 30 minutes after the hour)
- D. When the National Weather Service has announced a severe weather watch

T1I04 @T1E01 (A) [97.401a]

If a disaster disrupts normal communication systems in an area where the amateur service is regulated by the FCC, what kinds of transmissions may stations make?

- A. Those that are necessary to meet essential communication needs and facilitate relief actions
- B. Those that allow a commercial business to continue to operate in the affected area
- C. Those for which material compensation has been paid to the amateur operator for delivery into the affected area
- D. Those that are to be used for program production or news gathering for broadcasting purposes

T1I05 @T1E02 (C) [97.401c]

What information is included in an FCC declaration of a temporary state of communication emergency?

- A. A list of organizations authorized to use radio communications in the affected area
- B. A list of amateur frequency bands to be used in the affected area

- C. Any special conditions and special rules to be observed during the emergency
- D. An operating schedule for authorized amateur emergency stations

T1I06 @T1E03 (A) [97.3a10]

What is meant by the term broadcasting?

- A. Transmissions intended for reception by the general public, either direct or relayed
- B. Retransmission by automatic means of programs or signals from non-amateur stations
- C. One-way radio communications, regardless of purpose or content
- D. One-way or two-way radio communications between two or more stations

T1I07 @T1E10 (B) [97.113a4]

When may you send obscene words from your amateur station?

- A. Only when they do not cause interference to other communications
- B. Never; obscene words are not allowed in amateur transmissions
- C. Only when they are not retransmitted through a repeater
- D. Any time, but there is an unwritten rule among amateurs that they should not be used on the air

T1I08 @T1E11 (D) [97.113a4]

When may you send indecent words from your amateur station?

- A. Only when they do not cause interference to other communications
- B. Only when they are not retransmitted through a repeater
- C. Any time, but there is an unwritten rule among amateurs that they should not be used on the air
- D. Never; indecent words are not allowed in amateur transmissions

T1I09 @New (D) [97.113a4]

Why is indecent and obscene language prohibited in the Amateur Service?

- A. Because it is offensive to some individuals
- B. Because young children may intercept amateur communications with readily available receiving equipment
- C. Because such language is specifically prohibited by FCC Rules
- D. All of these choices are correct

T1I10 @NEW (A) [97.113a4]

Where can the official list of prohibited obscene and indecent words be found?

- A. There is no public list of prohibited obscene and indecent words; if you believe a word is questionable, don't use it in your communications
- B. The list is maintained by the Department of Commerce
- C. The list is International, and is maintained by Industry Canada
- D. The list is in the "public domain," and can be found in all amateur study guides

T1I11 [NEW} (D) [97.113b]

Under what conditions may a Technician class operator use his or her station to broadcast information intended for reception by the general public?

- A. Never, broadcasting is a privilege reserved for Extra and General class operators only
- B. Only when operating in the FM Broadcast band (88.1 to 107.9 MHz)

- C. Only when operating in the AM Broadcast band (530 to 1700 kHz)
- D. Never, broadcasts intended for reception by the general public are not permitted in the Amateur Service

SUBELEMENT T2 -- OPERATING PROCEDURES [5 Exam Questions -- 5 Groups]

T2A Preparing to transmit; choosing a frequency for tune-up; operating or emergencies; morse code; repeater operations and autopatch

T2A01 @N2A01 (A)

What should you do before you transmit on any frequency?

- A. Listen to make sure others are not using the frequency
- B. Listen to make sure that someone will be able to hear you
- C. Check your antenna for resonance at the selected frequency
- D. Make sure the SWR on your antenna feed line is high enough

T2A02 @N2A03 (D)

If you are in contact with another station and you hear an emergency call for help on your frequency, what should you do?

- A. Tell the calling station that the frequency is in use
- B. Direct the calling station to the nearest emergency net frequency
- C. Call your local Civil Preparedness Office and inform them of the emergency
- D. Stop your QSO immediately and take the emergency call

T2A03 @T2A12 (A)

Why should local amateur communications use VHF and UHF frequencies instead of HF frequencies?

- A. To minimize interference on HF bands capable of long-distance communication
- B. Because greater output power is permitted on VHF and UHF
- C. Because HF transmissions are not propagated locally
- D. Because signals are louder on VHF and UHF frequencies

T2A04 @T2A14 (B)

How can on-the-air interference be minimized during a lengthy transmitter testing or loading-up procedure?

- A. Choose an unoccupied frequency
- B. Use a dummy load
- C. Use a non-resonant antenna
- D. Use a resonant antenna that requires no loading-up procedure

T2A05 @N2A06 (C)

At what speed should a Morse code CQ call be transmitted?

- A. Only speeds below five WPM
- B. The highest speed your keyer will operate
- C. Any speed at which you can reliably receive
- D. The highest speed at which you can control the keyer

T2A06 @T2A04 (C)

What is an autopatch?

- A. An automatic digital connection between a US and a foreign amateur
- B. A digital connection used to transfer data between a hand-held radio and a computer
- C. A device that allows radio users to access the public telephone system

D. A video interface allowing images to be patched into a digital data stream

T2A07 @T2A10 (B)

How do you call another station on a repeater if you know the station's call sign?

- A. Say "break, break 79," then say the station's call sign
- B. Say the station's call sign, then identify your own station
- C. Say "CQ" three times, then say the station's call sign
- D. Wait for the station to call "CQ," then answer it

T2A08 @T2A08 (B)

What is a courtesy tone (used in repeater operations)?

- A. A sound used to identify the repeater
- B. A sound used to indicate when a transmission is complete
- C. A sound used to indicate that a message is waiting for someone
- D. A sound used to activate a receiver in case of severe weather

T2A09 @N2A08 (A)

What is the meaning of the procedural signal "DE"?

- A. "From" or "this is," as in "W0AIH DE KA9FOX"
- B. "Directional Emissions" from your antenna
- C. "Received all correctly"
- D. "Calling any station"

T2A10 @T2A07 (D)

During commuting rush hours, which type of repeater operation should be discouraged?

- A. Mobile stations
- B. Low-power stations
- C. Highway traffic information nets
- D. Third-party communications nets

T2A11 @T2A18 (D)

What is the proper way to break into a conversation on a repeater?

- A. Wait for the end of a transmission and start calling the desired party
- B. Shout, "break, break!" to show that you're eager to join the conversation
- C. Turn on an amplifier and override whoever is talking
- D. Say your call sign during a break between transmissions

T2B Definition and proper use; courteous operation; repeater frequency coordination; morse code

T2B01 @N2B09 (A)

When using a repeater to communicate, which of the following do you need to know about the repeater?

- A. Its input frequency and offset
- B. Its call sign
- C. Its power level
- D. Whether or not it has an autopatch

T2B02 @N2B11 (C)

What is an autopatch?

- A. Something that automatically selects the strongest signal to be repeated

- B. A device that connects a mobile station to the next repeater if it moves out of range of the first
- C. A device that allows repeater users to make telephone calls from their stations
- D. A device that locks other stations out of a repeater when there is an important conversation in progress

T2B03 @N2B12 (D)

What is the purpose of a repeater time-out timer?

- A. It lets a repeater have a rest period after heavy use
- B. It logs repeater transmit time to predict when a repeater will fail
- C. It tells how long someone has been using a repeater
- D. It limits the amount of time someone can transmit on a repeater

T2B04 @N2B13 (B)

What is a CTCSS (or PL) tone?

- A. A special signal used for telecommand control of model craft
- B. A sub-audible tone, added to a carrier, which may cause a receiver to accept a signal
- C. A tone used by repeaters to mark the end of a transmission
- D. A special signal used for telemetry between amateur space stations and Earth stations

T2B05 @T2A01 (A)

What is the usual input/output frequency separation for repeaters in the 2-meter band?

- A. 600 kHz
- B. 1.0 MHz
- C. 1.6 MHz
- D. 5.0 MHz

T2B06 @T2A02 (C)

What is the usual input/output frequency separation for repeaters in the 1.25-meter band?

- A. 600 kHz
- B. 1.0 MHz
- C. 1.6 MHz
- D. 5.0 MHz

T2B07 @T2A03 (D)

What is the usual input/output frequency separation for repeaters in the 70-centimeter band?

- A. 600 kHz
- B. 1.0 MHz
- C. 1.6 MHz
- D. 5.0 MHz

T2B08 @T2A05 (B)

What is the purpose of repeater operation?

- A. To cut your power bill by using someone else's higher power system
- B. To help mobile and low-power stations extend their usable range
- C. To transmit signals for observing propagation and reception
- D. To communicate with stations in services other than amateur

T2B09 @T2A11 (A)

What is a repeater called that is available for anyone to use?

- A. An open repeater
- B. A closed repeater
- C. An autopatch repeater
- D. A private repeater

T2B10 @T2A16 (C)

Why should you pause briefly between transmissions when using a repeater?

- A. To check the SWR of the repeater
- B. To reach for pencil and paper for third-party communications
- C. To listen for anyone wanting to break in
- D. To dial up the repeater's autopatch

T2B11 @T2A17 (A)

Why should you keep transmissions short when using a repeater?

- A. A long transmission may prevent someone with an emergency from using the repeater
- B. To see if the receiving station operator is still awake
- C. To give any listening non-hams a chance to respond
- D. To keep long-distance charges down

T2C Simplex operations; RST signal reporting; choice of equipment for desired communications; communications modes including amateur television (ATV), packet radio; Q signals, procedural signals and abbreviations

T2C01 @N2B14 (A)

What is simplex operation?

- A. Transmitting and receiving on the same frequency
- B. Transmitting and receiving over a wide area
- C. Transmitting on one frequency and receiving on another
- D. Transmitting one-way communications

T2C02 @N2B15 (B)

When should you use simplex operation instead of a repeater?

- A. When the most reliable communications are needed
- B. When a contact is possible without using a repeater
- C. When an emergency telephone call is needed
- D. When you are traveling and need some local information

T2C03 @T2B01 (C)

Why should simplex be used where possible, instead of using a repeater?

- A. Signal range will be increased
- B. Long distance toll charges will be avoided
- C. The repeater will not be tied up unnecessarily
- D. Your antenna's effectiveness will be better tested

T2C04 @T2B02 (A)

If you are talking to a station using a repeater, how would you find out if you could communicate using simplex instead?

- A. See if you can clearly receive the station on the repeater's input frequency
- B. See if you can clearly receive the station on a lower frequency band
- C. See if you can clearly receive a more distant repeater
- D. See if a third station can clearly receive both of you

T2C05 @N2A13 (D)

What does RST mean in a signal report?

- A. Recovery, signal strength, tempo
- B. Recovery, signal speed, tone
- C. Readability, signal speed, tempo
- D. Readability, signal strength, tone

T2C06 @T2B07 (D)

What is the meaning of: "Your signal report is five nine plus 20 dB...?"

- A. Your signal strength has increased by a factor of 100
- B. Repeat your transmission on a frequency 20 kHz higher
- C. The bandwidth of your signal is 20 decibels above linearity
- D. A relative signal-strength meter reading is 20 decibels greater than strength 9

T2C07 @N2A07 (D)

What is the meaning of the procedural signal "CQ"?

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

T2C08 @N2A16 (C)

What is a QSL card in the amateur service?

- A. A letter or postcard from an amateur pen pal
- B. A Notice of Violation from the FCC
- C. A written acknowledgment of communications between two amateurs
- D. A postcard reminding you when your license will expire

T2C09 @N2A17 (C)

What is the correct way to call CQ when using voice?

- A. Say "CQ" once, followed by "this is," followed by your call sign spoken three times
- B. Say "CQ" at least five times, followed by "this is," followed by your call sign spoken once
- C. Say "CQ" three times, followed by "this is," followed by your call sign spoken three times
- D. Say "CQ" at least ten times, followed by "this is," followed by your call sign spoken once

T2C10 @N2A18 (D)

How should you answer a voice CQ call?

- A. Say the other station's call sign at least ten times, followed by "this is," then your call sign at least twice
- B. Say the other station's call sign at least five times phonetically, followed by "this is," then your call sign at least once
- C. Say the other station's call sign at least three times, followed by "this is," then your call sign at least five times phonetically
- D. Say the other station's call sign once, followed by "this is," then your call sign given phonetically

T2C11 @T2A09 (A)

What is the meaning of: "Your signal is full quieting...?"

- A. Your signal is strong enough to overcome all receiver noise
- B. Your signal has no spurious sounds

- C. Your signal is not strong enough to be received
- D. Your signal is being received, but no audio is being heard

T2D Distress calling and emergency drills and communications -- operations and equipment; Radio Amateur Civil Emergency Service (RACES)

T2D01 @T2C01 (A)

What is the proper distress call to use when operating phone?

- A. Say "MAYDAY" several times
- B. Say "HELP" several times
- C. Say "EMERGENCY" several times
- D. Say "SOS" several times

T2D02 @T2C02 (D)

What is the proper distress call to use when operating CW?

- A. MAYDAY
- B. QRRR
- C. QRZ
- D. SOS

T2D03 @T2C03 (A)

What is the proper way to interrupt a repeater conversation to signal a distress call?

- A. Say "BREAK" twice, then your call sign
- B. Say "HELP" as many times as it takes to get someone to answer
- C. Say "SOS," then your call sign
- D. Say "EMERGENCY" three times

T2D04 @T2C04 (B)

What is one reason for using tactical call signs such as "command post" or "weather center" during an emergency?

- A. They keep the general public informed about what is going on
- B. They are more efficient and help coordinate public-service communications
- C. They are required by the FCC
- D. They increase goodwill between amateurs

T2D05 @T2C05 (D)

What type of messages concerning a person's well-being are sent into or out of a disaster area?

- A. Routine traffic
- B. Tactical traffic
- C. Formal message traffic
- D. Health and Welfare traffic

T2D06 @T2C06 (B)

What are messages called that are sent into or out of a disaster area concerning the immediate safety of human life?

- A. Tactical traffic
- B. Emergency traffic
- C. Formal message traffic
- D. Health and Welfare traffic

T2D07 @T2C07 (B)

Why is it a good idea to have a way to operate your amateur station without using commercial AC power lines?

- A. So you may use your station while mobile
- B. So you may provide communications in an emergency
- C. So you may operate in contests where AC power is not allowed
- D. So you will comply with the FCC rules

T2D08 @T2C08 (C)

What is the most important accessory to have for a hand-held radio in an emergency?

- A. An extra antenna
- B. A portable amplifier
- C. Several sets of charged batteries
- D. A microphone headset for hands-free operation

T2D09 @T2C09 (C)

Which type of antenna would be a good choice as part of a portable HF amateur station that could be set up in case of an emergency?

- A. A three-element quad
- B. A three-element Yagi
- C. A dipole
- D. A parabolic dish

T2D10 @T2C11 (A)

What is the maximum number of hours allowed per week for RACES drills?

- A. One
- B. Seven, but not more than one hour per day
- C. Eight
- D. As many hours as you want

T2D11 @T2C12 (D)

How must you identify messages sent during a RACES drill?

- A. As emergency messages
- B. As amateur traffic
- C. As official government messages
- D. As drill or test messages

T2E Voice communications and phonetics; SSB/CW weak signal operations; radioteleprinting; packet; special operations

T2E01 @N2A23 (A)

To make your call sign better understood when using voice transmissions, what should you do?

- A. Use Standard International Phonetics for each letter of your call
- B. Use any words that start with the same letters as your call sign for each letter of your call
- C. Talk louder
- D. Turn up your microphone gain

T2E02 @N2B03 (B)

What does the abbreviation "RTTY" stand for?

- A. "Returning to you", meaning "your turn to transmit"
- B. Radioteletype
- C. A general call to all digital stations
- D. Morse code practice over the air

T2E03 @N2B04 (C)

What does "connected" mean in a packet-radio link?

- A. A telephone link is working between two stations

- B. A message has reached an amateur station for local delivery
- C. A transmitting station is sending data to only one receiving station; it replies that the data is being received correctly
- D. A transmitting and receiving station are using a digipeater, so no other contacts can take place until they are finished

T2E04 @N2B05 (D)

What does "monitoring" mean on a packet-radio frequency?

- A. The FCC is copying all messages
- B. A member of the Amateur Auxiliary to the FCC's Compliance and Information Bureau is copying all messages
- C. A receiving station is displaying all messages sent to it, and replying that the messages are being received correctly
- D. A receiving station is displaying all messages on the frequency, and is not replying to any messages

T2E05 @N2B06 (A)

What is a digipeater?

- A. A packet-radio station that retransmits only data that is marked to be retransmitted
- B. A packet-radio station that retransmits any data that it receives
- C. A repeater that changes audio signals to digital data
- D. A repeater built using only digital electronics parts

T2E06 @N2B07 (B)

What does "network" mean in packet radio?

- A. A way of connecting terminal-node controllers by telephone so data can be sent over long distances
- B. A way of connecting packet-radio stations so data can be sent over long distances
- C. The wiring connections on a terminal-node controller board
- D. The programming in a terminal-node controller that rejects other callers if a station is already connected

T2E07 @T2B10 (B)

When should digital transmissions be used on 2-meter simplex voice frequencies?

- A. In between voice syllables
- B. Digital operations should be avoided on simplex voice frequencies
- C. Only in the evening
- D. At any time, so as to encourage the best use of the band

T2E08 @T2B09 (A)

Which of the following modes of communication are NOT available to a Technician class operator?

- A. CW and SSB on HF bands
- B. Amateur television (ATV)
- C. EME (Moon bounce)
- D. VHF packet, CW and SSB

T2E09 @N2B02 (B)

What speed should you use when answering a CQ call using RTTY?

- A. Half the speed of the received signal
- B. The same speed as the received signal
- C. Twice the speed of the received signal
- D. Any speed, since RTTY systems adjust to any signal speed

T2E10 @N1H12 (C) [97.11]

When may you operate your amateur station aboard a commercial aircraft?

- A. At any time
- B. Only while the aircraft is not in flight
- C. Only with the pilot's specific permission and not while the aircraft is operating under Instrument Flight Rules
- D. Only if you have written permission from the commercial airline company and not during takeoff and landing

T2E11 @N1H09 (D) [97.5a]

When may you operate your amateur station somewhere in the US besides the address listed on your license?

- A. Only during times of emergency
- B. Only after giving proper notice to the FCC
- C. During an emergency or an FCC-approved emergency practice
- D. Whenever you want to

SUBELEMENT T3 -- RADIO-WAVE PROPAGATION [3 Exam Questions -- 3 Groups]

T3A Line of sight; reflection of VHF/UHF signals

T3A01 @T3A01 (B)

How are VHF signals propagated within the range of the visible horizon?

- A. By sky wave
- B. By line of sight
- C. By plane wave
- D. By geometric refraction

T3A02 @N3A01 (A)

When a signal travels in a straight line from one antenna to another, what is this called?

- A. Line-of-sight propagation
- B. Straight line propagation
- C. Knife-edge diffraction
- D. Tunnel ducting

T3A03 @N3A02 (B)

How do VHF and UHF radio waves usually travel from a transmitting antenna to a receiving antenna?

- A. They bend through the ionosphere
- B. They go in a straight line
- C. They wander in any direction
- D. They move in a circle going either east or west from the transmitter

T3A04 @T3A12 (C)

What type of propagation usually occurs from one hand-held VHF transceiver to another nearby?

- A. Tunnel propagation
- B. Sky-wave propagation
- C. Line-of-sight propagation
- D. Auroral propagation

T3A05 @N3A10 (A)

What causes the ionosphere to form?

- A. Solar radiation ionizing the outer atmosphere
- B. Temperature changes ionizing the outer atmosphere
- C. Lightning ionizing the outer atmosphere
- D. Release of fluorocarbons into the atmosphere

T3A06 @N3A11 (C)

What type of solar radiation is most responsible for ionization in the outer atmosphere?

- A. Thermal
- B. Non-ionized particle
- C. Ultraviolet
- D. Microwave

T3A07 @N3A15 (C)

Which two daytime ionospheric regions combine into one region at night?

- A. E and F1
- B. D and E
- C. F1 and F2
- D. E1 and E2

T3A08 @New (C)

Which ionospheric region becomes one region at night, but separates into two separate regions during the day?

- A. D
- B. E
- C. F
- D. All of these choices

T3A09 @New (B)

Ultraviolet solar radiation is most responsible for ionization in what part of the atmosphere?

- A. Inner
- B. Outer
- C. All of these choices
- D. None of these choices

T3A10 @New (A)

What part of our atmosphere is formed by solar radiation ionizing the outer atmosphere

- A. Ionosphere
- B. Troposphere
- C. Ecosphere
- D. Stratosphere

T3A11 @N3A18 (C)

What can happen to VHF or UHF signals going towards a metal-framed building?

- A. They will go around the building
- B. They can be bent by the ionosphere
- C. They can be easily reflected by the building
- D. They are sometimes scattered in the ecosphere

T3B Tropospheric ducting or bending; amateur satellite and EME operations

T3B01 @T3A02 (C)

Ducting occurs in which region of the atmosphere?

- A. F2
- B. Ecosphere
- C. Troposphere
- D. Stratosphere

T3B02 @T3A03 (A)

What effect does tropospheric bending have on 2-meter radio waves?

- A. It lets you contact stations farther away
- B. It causes them to travel shorter distances
- C. It garbles the signal
- D. It reverses the sideband of the signal

T3B03 @T3A04 (D)

What causes tropospheric ducting of radio waves?

- A. A very low pressure area
- B. An aurora to the north
- C. Lightning between the transmitting and receiving stations
- D. A temperature inversion

T3B04 @T3A05 (B)

What causes VHF radio waves to be propagated several hundred miles over oceans?

- A. A polar air mass
- B. A widespread temperature inversion
- C. An overcast of cirriform clouds
- D. A high-pressure zone

T3B05 @T3A06 (A)

In which of the following frequency ranges does tropospheric ducting most often occur?

- A. UHF
- B. MF
- C. HF
- D. VLF

T3B06 @T3A08 (A)

What weather condition may cause tropospheric ducting?

- A. A stable high-pressure system
- B. An unstable low-pressure system
- C. A series of low-pressure waves
- D. Periods of heavy rainfall

T3B07 @T3A11 (C)

How does the signal loss for a given path through the troposphere vary with frequency?

- A. There is no relationship
- B. The path loss decreases as the frequency increases
- C. The path loss increases as the frequency increases
- D. There is no path loss at all

T3B08 @T3C05 (B)

Why are high-gain antennas normally used for EME (moonbounce) communications?

- A. To reduce the scattering of the reflected signal as it returns to Earth
- B. To overcome the extreme path losses of this mode

- C. To reduce the effects of polarization changes in the received signal
- D. To overcome the high levels of solar noise at the receiver

T3B09 @T3C07 (D)

Which of the following antenna systems would be the best choice for an EME (moonbounce) station?

- A. A single dipole antenna
- B. An isotropic antenna
- C. A ground-plane antenna
- D. A high-gain array of Yagi antennas

T3B10 @T3C10 (B)

When is it necessary to use a higher transmitter power level when conducting satellite communications?

- A. When the satellite is at its perigee
- B. When the satellite is low to the horizon
- C. When the satellite is fully illuminated by the sun
- D. When the satellite is near directly overhead

T3B11 @T3C11 (C)

Which of the following conditions must be met before two stations can conduct real-time communications through a satellite?

- A. Both stations must use circularly polarized antennas
- B. The satellite must be illuminated by the sun during the communications
- C. The satellite must be in view of both stations simultaneously
- D. Both stations must use high-gain antenna systems

T3C Ionospheric propagation, causes and variation; maximum usable frequency; Sporadic-E propagation; ground wave, HF propagation characteristics; sunspots and the sunspot cycle

T3C01 @T3B01 (D)

Which region of the ionosphere is mainly responsible for absorbing MF/HF radio signals during the daytime?

- A. The F2 region
- B. The F1 region
- C. The E region
- D. The D region

T3C02 @T3B05 (C)

If you are receiving a weak and distorted signal from a distant station on a frequency close to the maximum usable frequency, what type of propagation is probably occurring?

- A. Ducting
- B. Line-of-sight
- C. Scatter
- D. Ground-wave

T3C03 @T3B14 (A)

In relation to sky-wave propagation, what does the term "maximum usable frequency" (MUF) mean?

- A. The highest frequency signal that will reach its intended destination
- B. The lowest frequency signal that will reach its intended destination

- C. The highest frequency signal that is most absorbed by the ionosphere
- D. The lowest frequency signal that is most absorbed by the ionosphere

T3C04 @N3A03 (D)

When a signal travels along the surface of the Earth, what is this called?

- A. Sky-wave propagation
- B. Knife-edge diffraction
- C. E-region propagation
- D. Ground-wave propagation

T3C05 @N3A05 (A)

When a signal is returned to Earth by the ionosphere, what is this called?

- A. Sky-wave propagation
- B. Earth-Moon-Earth propagation
- C. Ground-wave propagation
- D. Tropospheric propagation

T3C06 @N3A07 (C)

What is a skip zone?

- A. An area covered by ground-wave propagation
- B. An area covered by sky-wave propagation
- C. An area that is too far away for ground-wave propagation, but too close for sky-wave propagation
- D. An area that is too far away for ground-wave or sky-wave propagation

T3C07 @N3A12 (B)

Which ionospheric region is closest to the Earth?

- A. The A region
- B. The D region
- C. The E region
- D. The F region

T3C08 @N3A13 (D)

Which region of the ionosphere is mainly responsible for long-distance sky-wave radio communications?

- A. D region
- B. E region
- C. F1 region
- D. F2 region

T3C09 @N3A14 (B)

Which of the ionospheric regions may split into two regions only during the daytime?

- A. Troposphere
- B. F
- C. Electrostatic
- D. D

T3C10 @N3A16 (A)

How does the number of sunspots relate to the amount of ionization in the ionosphere?

- A. The more sunspots there are, the greater the ionization

- B. The more sunspots there are, the less the ionization
- C. Unless there are sunspots, the ionization is zero
- D. Sunspots do not affect the ionosphere

T3C11 @N3A17 (C)

How long is an average sunspot cycle?

- A. 2 years
- B. 5 years
- C. 11 years
- D. 17 years

SUBELEMENT T4 -- AMATEUR RADIO PRACTICES [4 Exam Questions -- 4 Groups]

T4A Lightning protection and station grounding; safety interlocks, antenna installation safety procedures; dummy antennas

T4A01 @N4A04 (C)

How can an antenna system best be protected from lightning damage?

- A. Install a balun at the antenna feed point
- B. Install an RF choke in the antenna feed line
- C. Ground all antennas when they are not in use
- D. Install a fuse in the antenna feed line

T4A02 @N4A05 (D)

How can amateur station equipment best be protected from lightning damage?

- A. Use heavy insulation on the wiring
- B. Never turn off the equipment
- C. Disconnect the ground system from all radios
- D. Disconnect all equipment from the power lines and antenna cables

T4A03 @N4A06 (B)

For best protection from electrical shock, what should be grounded in an amateur station?

- A. The power supply primary
- B. All station equipment
- C. The antenna feed line
- D. The AC power mains

T4A04 @N4B01 (D)

Why would there be an interlock switch in a high-voltage power supply to turn off the power if its cabinet is opened?

- A. To keep dangerous RF radiation from leaking out through an open cabinet
- B. To keep dangerous RF radiation from coming in through an open cabinet
- C. To turn the power supply off when it is not being used
- D. To keep anyone opening the cabinet from getting shocked by dangerous high voltages

T4A05 @N4B05 (C)

Why should you wear a hard hat and safety glasses if you are on the ground helping someone work on an antenna tower?

- A. So you won't be hurt if the tower should accidentally fall
- B. To keep RF energy away from your head during antenna testing
- C. To protect your head from something dropped from the tower

D. So someone passing by will know that work is being done on the tower and will stay away

T4A06 @N4B08 (D)

What safety factors must you consider when using a bow and arrow or slingshot and weight to shoot an antenna-support line over a tree?

- A. You must ensure that the line is strong enough to withstand the shock of shooting the weight
- B. You must ensure that the arrow or weight has a safe flight path if the line breaks
- C. You must ensure that the bow and arrow or slingshot is in good working condition
- D. All of these choices are correct

T4A07 @N4B09 (B)

Which of the following is the best way to install your antenna in relation to overhead electric power lines?

- A. Always be sure your antenna wire is higher than the power line, and crosses it at a 90-degree angle
- B. Always be sure your antenna and feed line are well clear of any power lines
- C. Always be sure your antenna is lower than the power line, and crosses it at a small angle
- D. Only use vertical antennas within 100 feet of a power line

T4A08 @T4D04 (B)

What device is used in place of an antenna during transmitter tests so that no signal is radiated?

- A. An antenna matcher
- B. A dummy antenna
- C. A low-pass filter
- D. A decoupling resistor

T4A09 @T4D05 (A)

Why would you use a dummy antenna?

- A. For off-the-air transmitter testing
- B. To reduce output power
- C. To give comparative signal reports
- D. To allow antenna tuning without causing interference

T4A10 @T4D06 (A)

What minimum rating should a dummy antenna have for use with a 100 watt single-sideband phone transmitter?

- A. 100 watts continuous
- B. 141 watts continuous
- C. 175 watts continuous
- D. 200 watts continuous

T4A11 @T4D08 (B)

Would a 100 watt light bulb make a good dummy load for tuning a transceiver?

- A. Yes; a light bulb behaves exactly like a dummy load
- B. No; the impedance of the light bulb changes as the filament gets hot
- C. No; the light bulb would act like an open circuit
- D. No; the light bulb would act like a short circuit

T4B Electrical wiring, including switch location, dangerous voltages and currents; SWR meaning and measurements; SWR meters

T4B01 @T4A01 (C)

Where should the green wire in a three-wire AC line cord be connected in a power supply?

- A. To the fuse
- B. To the "hot" side of the power switch
- C. To the chassis
- D. To the white wire

T4B02 @T4A10 (A)

What is the minimum voltage that is usually dangerous to humans?

- A. 30 volts
- B. 100 volts
- C. 1000 volts
- D. 2000 volts

T4B03 @T4A14 (A)

How much electrical current flowing through the human body will probably be fatal?

- A. As little as 1/10 of an ampere
- B. Approximately 10 amperes
- C. More than 20 amperes
- D. Current through the human body is never fatal

T4B04 @T4A15 (A)

Which body organ can be fatally affected by a very small amount of electrical current?

- A. The heart
- B. The brain
- C. The liver
- D. The lungs

T4B05 @N4C02 (C)

What does an SWR reading of less than 1.5:1 mean?

- A. An impedance match that is too low
- B. An impedance mismatch; something may be wrong with the antenna system
- C. A fairly good impedance match
- D. An antenna gain of 1.5

T4B06 @N4C05 (A)

What does a very high SWR reading mean?

- A. The antenna is the wrong length, or there may be an open or shorted connection somewhere in the feed line
- B. The signals coming from the antenna are unusually strong, which means very good radio conditions
- C. The transmitter is putting out more power than normal, showing that it is about to go bad
- D. There is a large amount of solar radiation, which means very poor radio conditions

T4B07 @N4C06 (B)

If an SWR reading at the low frequency end of an amateur band is 2.5:1, increasing to 5:1 at the high frequency end of the same band, what does this tell you about your 1/2-wavelength dipole antenna?

- A. The antenna is broadbanded
- B. The antenna is too long for operation on the band
- C. The antenna is too short for operation on the band
- D. The antenna is just right for operation on the band

T4B08 @N4C07 (C)

If an SWR reading at the low frequency end of an amateur band is 5:1, decreasing to 2.5:1 at the high frequency end of the same band, what does this tell you about your 1/2-wavelength dipole antenna?

- A. The antenna is broadbanded
- B. The antenna is too long for operation on the band
- C. The antenna is too short for operation on the band
- D. The antenna is just right for operation on the band

T4B09 @N4C10 (D)

What instrument is used to measure the relative impedance match between an antenna and its feed line?

- A. An ammeter
- B. An ohmmeter
- C. A voltmeter
- D. An SWR meter

T4B10 @T4C09 (C)

If you use an SWR meter designed to operate on 3-30 MHz for VHF measurements, how accurate will its readings be?

- A. They will not be accurate
- B. They will be accurate enough to get by
- C. If it properly calibrates to full scale in the set position, they may be accurate
- D. They will be accurate providing the readings are multiplied by 4.5

T4B11 @N4C01 (B)

What does an SWR reading of 1:1 mean?

- A. An antenna for another frequency band is probably connected
- B. The best impedance match has been attained
- C. No power is going to the antenna
- D. The SWR meter is broken

T4C Meters and their placement in circuits, including volt, amp, multi, peak-reading and RF watt; ratings of fuses and switches

T4C01 @T4B01 (B)

How is a voltmeter usually connected to a circuit under test?

- A. In series with the circuit
- B. In parallel with the circuit
- C. In quadrature with the circuit
- D. In phase with the circuit

T4C02 @T4B02 (A)

How is an ammeter usually connected to a circuit under test?

- A. In series with the circuit
- B. In parallel with the circuit
- C. In quadrature with the circuit
- D. In phase with the circuit

T4C03 @T4B03 (A)

Where should an RF wattmeter be connected for the most accurate

readings of transmitter output power?

- A. At the transmitter output connector
- B. At the antenna feed point
- C. One-half wavelength from the transmitter output
- D. One-half wavelength from the antenna feed point

T4C04 @T4B07 (D)

For which measurements would you normally use a multimeter?

- A. SWR and power
- B. Resistance, capacitance and inductance
- C. Resistance and reactance
- D. Voltage, current and resistance

T4C05 @T4B08 (B)

What might happen if you switch a multimeter to measure resistance while you have it connected to measure voltage?

- A. The multimeter would read half the actual voltage
- B. It would probably destroy the meter circuitry
- C. The multimeter would read twice the actual voltage
- D. Nothing unusual would happen; the multimeter would measure the circuit's resistance

T4C06 @T4B09 (C)

If you switch a multimeter to read microamps and connect it into a circuit drawing 5 amps, what might happen?

- A. The multimeter would read half the actual current
- B. The multimeter would read twice the actual current
- C. It would probably destroy the meter circuitry
- D. The multimeter would read a very small value of current

T4C07 @T4B10 (B)

At what line impedance do most RF watt meters usually operate?

- A. 25 ohms
- B. 50 ohms
- C. 100 ohms
- D. 300 ohms

T4C08 @T4B11 (A)

What does a directional wattmeter measure?

- A. Forward and reflected power
- B. The directional pattern of an antenna
- C. The energy used by a transmitter
- D. Thermal heating in a load resistor

T4C09 @T4B12 (B)

If a directional RF wattmeter reads 90 watts forward power and 10 watts reflected power, what is the actual transmitter output power?

- A. 10 watts
- B. 80 watts
- C. 90 watts
- D. 100 watts

T4C10 @T4B14 (A)

Why might you use a peak-reading RF wattmeter at your station?

- A. To make sure your transmitter's output power is not higher than that authorized by your license class
- B. To make sure your transmitter is not drawing too much power from

the AC line

- C. To make sure all your transmitter's power is being radiated by your antenna
- D. To measure transmitter input and output power at the same time

T4C11 @T4B15 (C)

What could happen to your transceiver if you replace its blown 5 amp AC line fuse with a 30 amp fuse?

- A. The 30-amp fuse would better protect your transceiver from using too much current
- B. The transceiver would run cooler
- C. The transceiver could use more current than 5 amps and a fire could occur
- D. The transceiver would not be able to produce as much RF output

T4D RFI and its complications, resolution and responsibility

T4D01 @N4D01 (C)

What is meant by receiver overload?

- A. Too much voltage from the power supply
- B. Too much current from the power supply
- C. Interference caused by strong signals from a nearby source
- D. Interference caused by turning the volume up too high

T4D02 @N4D02 (A)

What is meant by harmonic radiation?

- A. Unwanted signals at frequencies that are multiples of the fundamental (chosen) frequency
- B. Unwanted signals that are combined with a 60-Hz hum
- C. Unwanted signals caused by sympathetic vibrations from a nearby transmitter
- D. Signals that cause skip propagation to occur

T4D03 @N4D06 (B)

What type of filter might be connected to an amateur HF transmitter to cut down on harmonic radiation?

- A. A key-click filter
- B. A low-pass filter
- C. A high-pass filter
- D. A CW filter

T4D04 @N4D08 (C)

If your neighbor reports television interference whenever you are transmitting from your amateur station, no matter what frequency band you use, what is probably the cause of the interference?

- A. Too little transmitter harmonic suppression
- B. Receiver VR tube discharge
- C. Receiver overload
- D. Incorrect antenna length

T4D05 @N4D09 (D)

If your neighbor reports television interference on one or two channels only when you are transmitting on the 15-meter band, what is probably the cause of the interference?

- A. Too much low-pass filtering on the transmitter
- B. De-ionization of the ionosphere near your neighbor's TV antenna
- C. TV receiver front-end overload

D. Harmonic radiation from your transmitter

T4D06 @N4D10 (B)

What type of filter should be connected to a TV receiver as the first step in trying to prevent RF overload from an amateur HF station transmission?

- A. Low-pass
- B. High-pass
- C. Band pass
- D. Notch

T4D07 @N4D11 (B)

What first step should be taken at a cable TV receiver when trying to prevent RF overload from an amateur HF station transmission?

- A. Install a low-pass filter in the cable system transmission line
- B. Tighten all connectors and inspect the cable system transmission line
- C. Make sure the center conductor of the cable system transmission line is well grounded
- D. Install a ceramic filter in the cable system transmission line

T4D08 @N4D12 (C)

What effect might a break in a cable television transmission line have on amateur communications?

- A. Cable lines are shielded and a break cannot affect amateur communications
- B. Harmonic radiation from the TV receiver may cause the amateur transmitter to transmit off-frequency
- C. TV interference may result when the amateur station is transmitting, or interference may occur to the amateur receiver
- D. The broken cable may pick up very high voltages when the amateur station is transmitting

T4D09 @N4D13 (A)

If you are told that your amateur station is causing television interference, what should you do?

- A. First make sure that your station is operating properly, and that it does not cause interference to your own television
- B. Immediately turn off your transmitter and contact the nearest FCC office for assistance
- C. Connect a high-pass filter to the transmitter output and a low-pass filter to the antenna-input terminals of the television
- D. Continue operating normally, because you have no reason to worry about the interference

T4D10 @N4D14 (C)

If harmonic radiation from your transmitter is causing interference to television receivers in your neighborhood, who is responsible for taking care of the interference?

- A. The owners of the television receivers are responsible
- B. Both you and the owners of the television receivers share the responsibility
- C. You alone are responsible, since your transmitter is causing the problem
- D. The FCC must decide if you or the owners of the television receivers are responsible

T4D11 @N4D15 (D)

If signals from your transmitter are causing front-end overload in your neighbor's television receiver, who is responsible for taking care of the interference?

- A. You alone are responsible, since your transmitter is causing the problem
- B. Both you and the owner of the television receiver share the responsibility
- C. The FCC must decide if you or the owner of the television receiver are responsible
- D. The owner of the television receiver is responsible

SUBELEMENT T5 -- ELECTRICAL PRINCIPLES [3 Exam Questions -- 3 Groups]

T5A Metric prefixes, e.g. pico, nano, micro, milli, centi, kilo, mega, giga; concepts, units and measurement of current, voltage; concept of conductor and insulator; concept of open and short circuits

T5A01 @N5A03 (B)

\*Modified Q,A-D

If a dial marked in kilohertz shows a reading of 28450 kHz, what would it show if it were marked in hertz?

- A. 284,500 Hz
- B. 28,450,000 Hz
- C. 284,500,000 Hz
- D. 284,500,000,000 Hz

T5A02 @N5A05 (C)

If an ammeter marked in amperes is used to measure a 3000-milliampere current, what reading would it show?

- A. 0.003 amperes
- B. 0.3 amperes
- C. 3 amperes
- D. 3,000,000 amperes

T5A03 @N5A09 (C)

How many hertz are in a kilohertz?

- A. 10
- B. 100
- C. 1000
- D. 1,000,000

T5A04 @N5B02 (C)

What is the basic unit of electric current?

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

T5A05 @N5B03 (D)

Which instrument would you use to measure electric current?

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

T5A06 @N5B08 (B)

Which instrument would you use to measure electric potential or electromotive force?

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

T5A07 @N5B05 (A)

What is the basic unit of electromotive force (EMF)?

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

T5A08 @N5B12 (C)

What are three good electrical conductors?

- A. Copper, gold, mica
- B. Gold, silver, wood
- C. Gold, silver, aluminum
- D. Copper, aluminum, paper

T5A09 @N5B13 (A)

What are four good electrical insulators?

- A. Glass, air, plastic, porcelain
- B. Glass, wood, copper, porcelain
- C. Paper, glass, air, aluminum
- D. Plastic, rubber, wood, carbon

T5A10 @N5C09 (C)

Which electrical circuit can have no current?

- A. A closed circuit
- B. A short circuit
- C. An open circuit
- D. A complete circuit

T5A11 @N5C11 (D)

Which electrical circuit draws too much current?

- A. An open circuit
- B. A dead circuit
- C. A closed circuit
- D. A short circuit

T5B Concepts, units and calculation of resistance, inductance and capacitance values in series and parallel circuits

T5B01 @T5A01 (D)

What does resistance do in an electric circuit?

- A. It stores energy in a magnetic field
- B. It stores energy in an electric field
- C. It provides electrons by a chemical reaction
- D. It opposes the flow of electrons

T5B02 @T5A02 (B)

What is the definition of 1 ohm?

- A. The reactance of a circuit in which a 1-microfarad capacitor is resonant at 1 MHz
- B. The resistance of a circuit in which a 1-amp current flows when 1

volt is applied

- C. The resistance of a circuit in which a 1-milliamp current flows when 1 volt is applied
- D. The reactance of a circuit in which a 1-millihenry inductor is resonant at 1 MHz

T5B03 @T5A03 (C)

What is the basic unit of resistance?

- A. The farad
- B. The watt
- C. The ohm
- D. The resistor

T5B04 @T5A04 (D)

What is one reason resistors are used in electronic circuits?

- A. To block the flow of direct current while allowing alternating current to pass
- B. To block the flow of alternating current while allowing direct current to pass
- C. To increase the voltage of the circuit
- D. To control the amount of current that flows for a particular applied voltage

T5B05 @T5A05 (D)

What is the ability to store energy in a magnetic field called?

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

T5B06 @T5A08 (B)

What is one reason inductors are used in electronic circuits?

- A. To block the flow of direct current while allowing alternating current to pass
- B. To reduce the flow of AC while allowing DC to pass freely
- C. To change the time constant of the applied voltage
- D. To change alternating current to direct current

T5B07 @T5A09 (D)

What is the ability to store energy in an electric field called?

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

T5B08 @T5A12 (A)

What is one reason capacitors are used in electronic circuits?

- A. To block the flow of direct current while allowing alternating current to pass
- B. To block the flow of alternating current while allowing direct current to pass
- C. To change the time constant of the applied voltage
- D. To change alternating current to direct current

T5B09 @T5B10 (D)

If two resistors are connected in series, what is their total resistance?

- A. The difference between the individual resistor values
- B. Always less than the value of either resistor
- C. The product of the individual resistor values
- D. The sum of the individual resistor values

T5B10 @T5B13 (A)

If two equal-value inductors are connected in parallel, what is their total inductance?

- A. Half the value of one inductor
- B. Twice the value of one inductor
- C. The same as the value of either inductor
- D. The value of one inductor times the value of the other

T5B11 @T5B14 (C)

If two equal-value capacitors are connected in series, what is their total capacitance?

- A. Twice the value of one capacitor
- B. The same as the value of either capacitor
- C. Half the value of either capacitor
- D. The value of one capacitor times the value of the other

T5C Ohm's Law (any calculations will be kept to a very low level - no fractions or decimals) and the concepts of energy and power, and; concepts of frequency, including AC vs. DC, frequency units, and wavelength

T5C01 @T5B01 (C)

How is the current in a DC circuit directly calculated when the voltage and resistance are known?

- A.  $I = R \times E$  [current equals resistance multiplied by voltage]
- B.  $I = R / E$  [current equals resistance divided by voltage]
- C.  $I = E / R$  [current equals voltage divided by resistance]
- D.  $I = E / P$  [current equals voltage divided by power]

T5C02 @T5B02 (B)

How is the resistance in a DC circuit calculated when the voltage and current are known?

- A.  $R = I / E$  [resistance equals current divided by voltage]
- B.  $R = E / I$  [resistance equals voltage divided by current]
- C.  $R = I \times E$  [resistance equals current multiplied by voltage]
- D.  $R = P / E$  [resistance equals power divided by voltage]

T5C03 @T5B03 (C)

How is the voltage in a DC circuit directly calculated when the current and resistance are known?

- A.  $E = I / R$  [voltage equals current divided by resistance]
- B.  $E = R / I$  [voltage equals resistance divided by current]
- C.  $E = I \times R$  [voltage equals current multiplied by resistance]
- D.  $E = I / P$  [voltage equals current divided by power]

T5C04 @N5C03 (C)

If a current of 2 amperes flows through a 50-ohm resistor, what is the voltage across the resistor?

- A. 25 volts
- B. 52 volts
- C. 100 volts
- D. 200 volts

T5C05 @N5C04 (B)

If a 100-ohm resistor is connected to 200 volts, what is the current through the resistor?

- A. 1 ampere
- B. 2 amperes
- C. 300 amperes
- D. 20,000 amperes

T5C06 @N5C05 (B)

If a current of 3 amperes flows through a resistor connected to 90 volts, what is the resistance?

- A. 3 ohms
- B. 30 ohms
- C. 93 ohms
- D. 270 ohms

T5C07 @N5C06 (C)

What term describes how fast electrical energy is used?

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

T5C08 @N5C08 (B)

What is the basic unit of electrical power?

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

T5C09 @N5D14 (A)

What happens to a signal's wavelength as its frequency increases?

- A. It gets shorter
- B. It gets longer
- C. It stays the same
- D. It disappears

T5C10 @N5D03 (A)

What is the name of a current that flows back and forth, first in one direction, then in the opposite direction?

- A. An alternating current
- B. A direct current
- C. A rough current
- D. A steady state current

T5C11 @N5D01 (B)

What is the name of a current that flows only in one direction?

- A. An alternating current
- B. A direct current
- C. A normal current
- D. A smooth current

SUBELEMENT T6 -- CIRCUIT COMPONENTS [2 Exam Questions -- 2 Groups]

T6A Electrical function and/or schematic representation of resistor, switch, fuse, or battery; resistor construction types, variable and

fixed, color code, power ratings, schematic symbols

T6A01 @T6A02 (C)

What does a variable resistor or potentiometer do?

- A. Its resistance changes when AC is applied to it
- B. It transforms a variable voltage into a constant voltage
- C. Its resistance changes when its slide or contact is moved
- D. Its resistance changes when it is heated

T6A02 @T6A12 (A)

Which symbol of Figure T6-1 represents a fixed resistor?

- A. Symbol 2
- B. Symbol 3
- C. Symbol 4
- D. Symbol 5

T6A03 @N6A02 (D)

Why would you use a double-pole, single-throw switch?

- A. To switch one input to one output
- B. To switch one input to either of two outputs
- C. To switch two inputs at the same time, one input to either of two outputs, and the other input to either of two outputs
- D. To switch two inputs at the same time, one input to one output, and the other input to the other output

T6A04 @N6A10 (A)

In Figure N6-2, which symbol represents a single-pole, single-throw switch?

- A. Symbol 1
- B. Symbol 2
- C. Symbol 3
- D. Symbol 4

T6A05 @N6A03 (D)

Why would you use a fuse?

- A. To create a short circuit when there is too much current in a circuit
- B. To change direct current into alternating current
- C. To change alternating current into direct current
- D. To create an open circuit when there is too much current in a circuit

T6A06 @N6A08 (A)

In Figure N6-1, which symbol represents a fuse?

- A. Symbol 1
- B. Symbol 3
- C. Symbol 5
- D. Symbol 7

T6A07 @N6A04 (A)

Which of these components has a positive and a negative side?

- A. A battery
- B. A potentiometer
- C. A fuse
- D. A resistor

T6A08 @N6A09 (D)

In Figure N6-1, which symbol represents a single-cell battery?

- A. Symbol 7
- B. Symbol 5
- C. Symbol 1
- D. Symbol 4

T6A09 @T6A08 (C)

Why would a large size resistor be used instead of a smaller one of the same resistance value?

- A. For better response time
- B. For a higher current gain
- C. For greater power dissipation
- D. For less impedance in the circuit

T6A10 @T6A05 (A)

What do the first three color bands on a resistor indicate?

- A. The value of the resistor in ohms
- B. The resistance tolerance in percent
- C. The power rating in watts
- D. The resistance material

T6A11 @T6A10 (A)

Which tolerance rating would indicate a high-precision resistor?

- A. 0.1%
- B. 5%
- C. 10%
- D. 20%

T6B Electrical function and/or schematic representation of a ground, antenna, inductor, capacitor, transistor, integrated circuit; construction of variable and fixed inductors and capacitors; factors affecting inductance and capacitance

T6B01 @N6B01 (A)

Which component can amplify a small signal using low voltages?

- A. A PNP transistor
- B. A variable resistor
- C. An electrolytic capacitor
- D. A multiple-cell battery

T6B02 @N6B03 (A)

Which component is used to radiate radio energy?

- A. An antenna
- B. An earth ground
- C. A chassis ground
- D. A potentiometer

T6B03 @N6B04 (D)

In Figure N6-1, which symbol represents an earth ground?

- A. Symbol 2
- B. Symbol 5
- C. Symbol 6
- D. Symbol 8

T6B04 @N6B06 (D)

In Figure N6-1, which symbol represents an antenna?

- A. Symbol 2

- B. Symbol 3
- C. Symbol 6
- D. Symbol 7

T6B05 @N6B07 (D)

In Figure N6-3, which symbol represents an NPN transistor?

- A. Symbol 1
- B. Symbol 2
- C. Symbol 3
- D. Symbol 4

T6B06 @T6B01 (A)

Which symbol of Figure T6-2 represents a fixed-value capacitor?

- A. Symbol 1
- B. Symbol 2
- C. Symbol 3
- D. Symbol 4

T6B07 @T6B06 (C)

In Figure T6-2, which symbol represents a variable capacitor?

- A. Symbol 1
- B. Symbol 2
- C. Symbol 3
- D. Symbol 4

T6B08 @T6B08 (C)

What does an inductor do?

- A. It stores energy electrostatically and opposes a change in voltage
- B. It stores energy electrochemically and opposes a change in current
- C. It stores energy electromagnetically and opposes a change in current
- D. It stores energy electromechanically and opposes a change in voltage

T6B09 @T6B10 (A)

As an iron core is inserted in a coil, what happens to the coil's inductance?

- A. It increases
- B. It decreases
- C. It stays the same
- D. It disappears

T6B10 @T6B13 (B)

What does a capacitor do?

- A. It stores energy electrochemically and opposes a change in current
- B. It stores energy electrostatically and opposes a change in voltage
- C. It stores energy electromagnetically and opposes a change in current
- D. It stores energy electromechanically and opposes a change in voltage

T6B11 @T6B14 (A)

What determines the capacitance of a capacitor?

- A. The material between the plates, the area of one side of one plate, the number of plates and the spacing between the plates
- B. The material between the plates, the number of plates and the size of the wires connected to the plates

- C. The number of plates, the spacing between the plates and whether the dielectric material is N type or P type
- D. The material between the plates, the area of one plate, the number of plates and the material used for the protective coating

SUBELEMENT T7 -- PRACTICAL CIRCUITS [2 Exam Questions -- 2 Groups]

T7A Functional layout of station components including transmitter, transceiver, receiver, power supply, antenna, antenna switch, antenna feed line, impedance-matching device, SWR meter; station layout and accessories for radiotelephone, radioteleprinter (RTTY) or packet

T7A01 @N7A01 (B)

What would you connect to your transceiver if you wanted to switch it between several antennas?

- A. A terminal-node switch
- B. An antenna switch
- C. A telegraph key switch
- D. A high-pass filter

T7A02 @N7A03 (D)

What connects your transceiver to your antenna?

- A. A dummy load
- B. A ground wire
- C. The power cord
- D. A feed line

T7A03 @N7A07 (A)

If your mobile transceiver works in your car but not in your home, what should you check first?

- A. The power supply
- B. The speaker
- C. The microphone
- D. The SWR meter

T7A04 @N7A08 (A)

What does an antenna tuner do?

- A. It matches a transceiver output impedance to the antenna system impedance
- B. It helps a receiver automatically tune in stations that are far away
- C. It switches an antenna system to a transceiver when sending, and to a receiver when listening
- D. It switches a transceiver between different kinds of antennas connected to one feed line

T7A05 @N7A09 (B)

In Figure N7-1, if block 1 is a transceiver and block 3 is a dummy antenna, what is block 2?

- A. A terminal-node switch
- B. An antenna switch
- C. A telegraph key switch
- D. A high-pass filter

T7A06 @N7A11 (D)

In Figure N7-1, if block 1 is a transceiver and block 2 is an antenna switch, what is block 3?

- A. A terminal-node switch
- B. An SWR meter
- C. A telegraph key switch
- D. A dummy antenna

T7A07 @N7A13 (C)

In Figure N7-2, if block 1 is a transceiver and block 3 is an antenna switch, what is block 2?

- A. A terminal-node switch
- B. A dipole antenna
- C. An SWR meter
- D. A high-pass filter

T7A08 @N7A15 (B)

In Figure N7-3, if block 1 is a transceiver and block 2 is an SWR meter, what is block 3?

- A. An antenna switch
- B. An antenna tuner
- C. A key-click filter
- D. A terminal-node controller

T7A09 @N7B05 (D)

What would you connect to a transceiver for voice operation?

- A. A splatter filter
- B. A terminal-voice controller
- C. A receiver audio filter
- D. A microphone

T7A10 @N7B06 (A)

What would you connect to a transceiver for RTTY operation?

- A. A modem and a teleprinter or computer system
- B. A computer, a printer and a RTTY refresh unit
- C. A data-inverter controller
- D. A modem, a monitor and a DTMF keypad

T7A11 @N7B11 (B)

In packet-radio operation, what equipment connects to a terminal-node controller?

- A. A transceiver and a modem
- B. A transceiver and a terminal or computer system
- C. A DTMF keypad, a monitor and a transceiver
- D. A DTMF microphone, a monitor and a transceiver

T7B Transmitter and receiver block diagrams; purpose and operation of low-pass, high-pass and band-pass filters

T7B01 @T7A03 (D)

What circuit uses a limiter and a frequency discriminator to produce an audio signal?

- A. A double-conversion receiver
- B. A variable-frequency oscillator
- C. A superheterodyne receiver
- D. An FM receiver

T7B02 @T7A04 (D)

What circuit is pictured in Figure T7-1 if block 1 is a variable-frequency oscillator?

- A. A packet-radio transmitter
- B. A crystal-controlled transmitter
- C. A single-sideband transmitter
- D. A VFO-controlled transmitter

T7B03 @T7A05 (A)

What circuit is pictured in Figure T7-1 if block 1 is a crystal oscillator?

- A. A crystal-controlled transmitter
- B. A VFO-controlled transmitter
- C. A single-sideband transmitter
- D. A CW transceiver

T7B04 @T7A08 (C)

What type of circuit does Figure T7-2 represent if block 1 is a product detector?

- A. A simple phase modulation receiver
- B. A simple FM receiver
- C. A simple CW and SSB receiver
- D. A double-conversion multiplier

T7B05 @T7A09 (D)

If Figure T7-2 is a diagram of a simple single-sideband receiver, what type of circuit should be shown in block 1?

- A. A high pass filter
- B. A ratio detector
- C. A low pass filter
- D. A product detector

T7B06 @T7A10 (D)

What circuit is pictured in Figure T7-3, if block 1 is a frequency discriminator?

- A. A double-conversion receiver
- B. A variable-frequency oscillator
- C. A superheterodyne receiver
- D. An FM receiver

T7B07 @T7A16 (C)

Why do modern HF transmitters have a built-in low-pass filter in their RF output circuits?

- A. To reduce RF energy below a cutoff point
- B. To reduce low-frequency interference to other amateurs
- C. To reduce harmonic radiation
- D. To reduce fundamental radiation

T7B08 @T7A17 (A)

What circuit blocks RF energy above and below certain limits?

- A. A band-pass filter
- B. A high-pass filter
- C. An input filter
- D. A low-pass filter

T7B09 @T7A18 (A)

What type of filter is used in the IF section of receivers to block energy outside a certain frequency range?

- A. A band-pass filter
- B. A high-pass filter

- C. An input filter
- D. A low-pass filter

T7B10 @T7A19 (C)

What circuit function is found in all types of receivers?

- A. An audio filter
- B. A beat-frequency oscillator
- C. A detector
- D. An RF amplifier

T7B11 @T7A20 (D)

What would you use to connect a dual-band antenna to a mobile transceiver which has separate VHF and UHF outputs?

- A. A dual-needle SWR meter
- B. A full-duplex phone patch
- C. Twin high-pass filters
- D. A duplexer

SUBELEMENT T8 -- SIGNALS AND EMISSIONS [2 Exam Questions -- 2 Groups]

T8A RF carrier, definition and typical bandwidths; harmonics and unwanted signals; chirp; superimposed hum; equipment and adjustments to help reduce interference to others

T8A01 @T8B02 (C)

What is an RF carrier?

- A. The part of a transmitter that carries the signal to the transmitter antenna
- B. The part of a receiver that carries the signal from the antenna to the detector
- C. A radio frequency signal that is modulated to produce a radiotelephone signal
- D. A modulation that changes a radio frequency signal to produce a radiotelephone signal

T8A02 @T8B07 (C)

Which list of emission types is in order from the narrowest bandwidth to the widest bandwidth?

- A. RTTY, CW, SSB voice, FM voice
- B. CW, FM voice, RTTY, SSB voice
- C. CW, RTTY, SSB voice, FM voice
- D. CW, SSB voice, RTTY, FM voice

T8A03 @T8B08 (D)

What is the usual bandwidth of a single-sideband amateur signal?

- A. 1 kHz
- B. 2 kHz
- C. Between 3 and 6 kHz
- D. Between 2 and 3 kHz

T8A04 @T8B09 (C)

What is the usual bandwidth of a frequency-modulated amateur signal?

- A. Less than 5 kHz
- B. Between 5 and 10 kHz
- C. Between 10 and 20 kHz
- D. Greater than 20 kHz

T8A05 @T8A02 (C)

What is the name for emissions produced by switching a transmitter's output on and off?

- A. Phone
- B. Test
- C. CW
- D. RTTY

T8A06 @T8A03 (B)

What term describes the process of combining an information signal with a radio signal?

- A. Superposition
- B. Modulation
- C. Demodulation
- D. Phase-inversion

T8A07 @T8B11 (B)

What is the result of over deviation in an FM transmitter?

- A. Increased transmitter power
- B. Out-of-channel emissions
- C. Increased transmitter range
- D. Poor carrier suppression

T8A08 @T8B12 (C)

What causes splatter interference?

- A. Keying a transmitter too fast
- B. Signals from a transmitter's output circuit are being sent back to its input circuit
- C. Overmodulation of a transmitter
- D. The transmitting antenna is the wrong length

T8A09 @N8B01 (C)

How does the frequency of a harmonic compare to the desired transmitting frequency?

- A. It is slightly more than the desired frequency
- B. It is slightly less than the desired frequency
- C. It is exactly two, or three, or more times the desired frequency
- D. It is much less than the desired frequency

T8A10 @N8B15 (B)

What should you check if you change your transceiver's microphone from a mobile type to a base station type?

- A. Check the CTCSS levels on the oscilloscope
- B. Make an on-the-air radio check to ensure the quality of your signal
- C. Check the amount of current the transceiver is now using
- D. Check to make sure the frequency readout is now correct

T8A11 @N8B16 (C)

Why is good station grounding needed when connecting your computer to your transceiver to receive high-frequency data signals?

- A. Good grounding raises the receiver's noise floor
- B. Good grounding protects the computer from nearby lightning strikes
- C. Good grounding will minimize stray noise on the receiver
- D. FCC rules require all equipment to be grounded

T8B Concepts and types of modulation: CW, phone, RTTY and data

emission types; FM deviation

T8B01 @T8A04 (B)

What is the name for packet-radio emissions?

- A. CW
- B. Data
- C. Phone
- D. RTTY

T8B02 @T8A06 (D)

What is the name of the voice emission most used on VHF/UHF repeaters?

- A. Single-sideband phone
- B. Pulse-modulated phone
- C. Slow-scan phone
- D. Frequency-modulated phone

T8B03 @T8A08 (A)

What is meant by the upper-sideband (USB)?

- A. The part of a single-sideband signal that is above the carrier frequency
- B. The part of a single-sideband signal that is below the carrier frequency
- C. Any frequency above 10 MHz
- D. The carrier frequency of a single-sideband signal

T8B04 @N8A06 (C)

What does the term "phone transmissions" usually mean?

- A. The use of telephones to set up an amateur contact
- B. A phone patch between amateur radio and the telephone system
- C. AM, FM or SSB voice transmissions by radiotelephony
- D. Placing the telephone handset near a transceiver's microphone and speaker to relay a telephone call

T8B05 @N8A07 (A)

How is an HF RTTY signal usually produced?

- A. By frequency-shift keying an RF signal
- B. By on/off keying an RF signal
- C. By digital pulse-code keying of an unmodulated carrier
- D. By on/off keying an audio-frequency signal

T8B06 @N8A11 (D)

What are two advantages to using modern data-transmission techniques for communications?

- A. Very simple and low-cost equipment
- B. No parity-checking required and high transmission speed
- C. Easy for mobile stations to use and no additional cabling required
- D. High transmission speed and communications reliability

T8B07 @N8A05 (A)

Which sideband is commonly used for 10-meter phone operation?

- A. Upper sideband
- B. Lower sideband
- C. Amplitude-compandored sideband
- D. Double sideband

T8B08 @N8B11 (D)

What can you do if you are told your FM hand-held or mobile

transceiver is over-deviating?  
A. Talk louder into the microphone  
B. Let the transceiver cool off  
C. Change to a higher power level  
D. Talk farther away from the microphone

T8B09 @N8B12 (C)

What does chirp mean?

A. An overload in a receiver's audio circuit whenever CW is received  
B. A high-pitched tone that is received along with a CW signal  
C. A small change in a transmitter's frequency each time it is keyed  
D. A slow change in transmitter frequency as the circuit warms up

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

T9A Wavelength vs. antenna length; 1/2 wavelength dipole and 1/4 wavelength vertical antennas; multiband antennas

T9A01 @N9A01 (D)

How do you calculate the length (in feet) of a half-wavelength dipole antenna?

A. Divide 150 by the antenna's operating frequency (in MHz) [150/f(in MHz)]  
B. Divide 234 by the antenna's operating frequency (in MHz) [234/f (in MHz)]  
C. Divide 300 by the antenna's operating frequency (in MHz) [300/f (in MHz)]  
D. Divide 468 by the antenna's operating frequency (in MHz) [468/f (in MHz)]

T9A02 @N9A02 (B)

How do you calculate the length (in feet) of a quarter-wavelength vertical antenna?

A. Divide 150 by the antenna's operating frequency (in MHz) [150/f (in MHz)]  
B. Divide 234 by the antenna's operating frequency (in MHz) [234/f (in MHz)]  
C. Divide 300 by the antenna's operating frequency (in MHz) [300/f (in MHz)]  
D. Divide 468 by the antenna's operating frequency (in MHz) [468/f (in MHz)]

T9A03 New (C)

How long should you make a quarter-wavelength vertical antenna for 440 MHz (measured to the nearest inch)?

A. 12 inches  
B. 9 inches  
C. 6 inches  
D. 3 inches

T9A04 New (A)

How long should you make a quarter-wavelength vertical antenna for 28.450 MHz (measured to the nearest foot)?

A. 8 ft  
B. 12 ft  
C. 16 ft

D. 24 ft

T9A05 New (C)

How long should you make a quarter-wavelength vertical antenna for 146 MHz (measured to the nearest inch)?

- A. 112 inches
- B. 50 inches
- C. 19 inches
- D. 12 inches

T9A06 @N9A08 (A)

If an antenna is made longer, what happens to its resonant frequency?

- A. It decreases
- B. It increases
- C. It stays the same
- D. It disappears

T9A07 @N9A09 (B)

If an antenna is made shorter, what happens to its resonant frequency?

- A. It decreases
- B. It increases
- C. It stays the same
- D. It disappears

T9A08 @N9A10 (A)

How could you decrease the resonant frequency of a dipole antenna?

- A. Lengthen the antenna
- B. Shorten the antenna
- C. Use less feed line
- D. Use a smaller size feed line

T9A09 @N9A11 (B)

How could you increase the resonant frequency of a dipole antenna?

- A. Lengthen the antenna
- B. Shorten the antenna
- C. Use more feed line
- D. Use a larger size feed line

T9A10 @N9A12 (A)

What is one advantage to using a multiband antenna?

- A. You can operate on several bands with a single feed line
- B. Multiband antennas always have high gain
- C. You can transmit on several frequencies simultaneously
- D. Multiband antennas offer poor harmonic suppression

T9A11 @N9A13 (D)

What is one disadvantage to using a multiband antenna?

- A. It must always be used with a balun
- B. It will always have low gain
- C. It cannot handle high power
- D. It can radiate unwanted harmonics

T9B Parasitic beam directional antennas; polarization, impedance matching and SWR, feed lines, balanced vs. unbalanced (including baluns)

T9B01 @T9A01 (C)

What is a directional antenna?

- A. An antenna that sends and receives radio energy equally well in all directions
- B. An antenna that cannot send and receive radio energy by skywave or skip propagation
- C. An antenna that sends and receives radio energy mainly in one direction
- D. An antenna that uses a directional coupler to measure power transmitted

T9B02 @T9A02 (A)

How is a Yagi antenna constructed?

- A. Two or more straight, parallel elements are fixed in line with each other
- B. Two or more square or circular loops are fixed in line with each other
- C. Two or more square or circular loops are stacked inside each other
- D. A straight element is fixed in the center of three or more elements that angle toward the ground

T9B03 @T9A04 (B)

How many directly driven elements do most parasitic beam antennas have?

- A. None
- B. One
- C. Two
- D. Three

T9B04 @T9A05 (A)

What is a parasitic beam antenna?

- A. An antenna in which some elements obtain their radio energy by induction or radiation from a driven element
- B. An antenna in which wave traps are used to magnetically couple the elements
- C. An antenna in which all elements are driven by direct connection to the feed line
- D. An antenna in which the driven element obtains its radio energy by induction or radiation from director elements

T9B05 @T9A06 (D)

What are the parasitic elements of a Yagi antenna?

- A. The driven element and any reflectors
- B. The director and the driven element
- C. Only the reflectors (if any)
- D. Any directors or any reflectors

T9B06 @T9A07 (B)

What is a cubical quad antenna?

- A. Four straight, parallel elements in line with each other, each approximately 1/2-electrical wavelength long
- B. Two or more parallel four-sided wire loops, each approximately one-electrical wavelength long
- C. A vertical conductor 1/4-electrical wavelength high, fed at the bottom
- D. A center-fed wire 1/2-electrical wavelength long

T9B07 @T9A10 (D)

What type of non-directional antenna is easy to make at home and works well outdoors?

- A. A Yagi
- B. A delta loop
- C. A cubical quad
- D. A ground plane

T9B08 @T9B06 (D)

What electromagnetic-wave polarization does most man-made electrical noise have in the HF and VHF spectrum?

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

T9B09 @T9B09 (D)

What does standing-wave ratio mean?

- A. The ratio of maximum to minimum inductances on a feed line
- B. The ratio of maximum to minimum capacitances on a feed line
- C. The ratio of maximum to minimum impedances on a feed line
- D. The ratio of maximum to minimum voltages on a feed line

T9B10 @N9C12 (A)

Where would you install a balun to feed a dipole antenna with 50-ohm coaxial cable?

- A. Between the coaxial cable and the antenna
- B. Between the transmitter and the coaxial cable
- C. Between the antenna and the ground
- D. Between the coaxial cable and the ground

T9B11 @N9C02 (B)

Why does coaxial cable make a good antenna feed line?

- A. You can make it at home, and its impedance matches most amateur antennas
- B. It is weatherproof, and it can be used near metal objects
- C. It is weatherproof, and its impedance is higher than that of most amateur antennas
- D. It can be used near metal objects, and its impedance is higher than that of most amateur antennas

SUBELEMENT T0 -- RF SAFETY [3 Exam Questions -- 3 Groups]

T0A RF safety fundamentals, terms and definitions

T0A01 @T0A01 (B)

Why is it a good idea to adhere to the FCC's Rules for using the minimum power needed when you are transmitting with your hand-held radio?

- A. Large fines are always imposed on operators violating this rule
- B. To reduce the level of RF radiation exposure to the operator's head
- C. To reduce calcification of the NiCd battery pack
- D. To eliminate self oscillation in the receiver RF amplifier

T0A02 @T0A02 (D)

Over what frequency range are the FCC Regulations most stringent for RF radiation exposure?

- A. Frequencies below 300 kHz
- B. Frequencies between 300 kHz and 3 MHz
- C. Frequencies between 3 MHz and 30 MHz
- D. Frequencies between 30 MHz and 300 MHz

T0A03 @T0A03 (C)

What is one biological effect to the eye that can result from RF exposure?

- A. The strong magnetic fields can cause blurred vision
- B. The strong magnetic fields can cause polarization lens
- C. It can cause heating, which can result in the formation of cataracts
- D. It can cause heating, which can result in astigmatism

T0A04 @T0A05 (C)

In the far field, as the distance from the source increases, how does power density vary?

- A. The power density is proportional to the square of the distance
- B. The power density is proportional to the square root of the distance
- C. The power density is proportional to the inverse square of the distance
- D. The power density is proportional to the inverse cube of the distance

T0A05 @T0A06 (D)

In the near field, how does the field strength vary with distance from the source?

- A. It always increases with the cube of the distance
- B. It always decreases with the cube of the distance
- C. It varies as a sine wave with distance
- D. It depends on the type of antenna being used

T0A06 @T0A09 (A)

Why should you never look into the open end of a microwave feed horn antenna while the transmitter is operating?

- A. You may be exposing your eyes to more than the maximum permissible exposure of RF radiation
- B. You may be exposing your eyes to more than the maximum permissible exposure level of infrared radiation
- C. You may be exposing your eyes to more than the maximum permissible exposure level of ultraviolet radiation
- D. All of these choices are correct

T0A07 @T0A10 (D)

Why are Amateur Radio operators required to meet the FCC RF radiation exposure limits?

- A. The standards are applied equally to all radio services
- B. To ensure that RF radiation occurs only in a desired direction
- C. Because amateur station operations are more easily adjusted than those of commercial radio services
- D. To ensure a safe operating environment for amateurs, their families and neighbors

T0A08 @T0A11 (A)

Why are the maximum permissible exposure (MPE) levels not uniform throughout the radio spectrum?

- A. The human body absorbs energy differently at various frequencies
- B. Some frequency ranges have a cooling effect while others have a heating effect on the body
- C. Some frequency ranges have no effect on the body
- D. Radiation at some frequencies can have a catalytic effect on the body

T0A09 @T0B01 (C)

What does the term "specific absorption rate" or SAR mean?

- A. The degree of RF energy consumed by the ionosphere
- B. The rate at which transmitter energy is lost because of a poor feed line
- C. The rate at which RF energy is absorbed into the human body
- D. The amount of signal weakening caused by atmospheric phenomena

T0A10 @T0B04 (D)

On what value are the maximum permissible exposure (MPE) limits based?

- A. The square of the mass of the exposed body
- B. The square root of the mass of the exposed body
- C. The whole-body specific gravity (WBSG)
- D. The whole-body specific absorption rate (SAR)

T0B RF safety rules and guidelines

T0B01 @T0C09 (C)

Where will you find the applicable FCC RF radiation maximum permissible exposure (MPE) limits defined?

- A. FCC Part 97 Amateur Service Rules and Regulations
- B. FCC Part 15 Radiation Exposure Rules and Regulations
- C. FCC Part 1 and Office of Engineering and Technology (OET) Bulletin 65
- D. Environmental Protection Agency Regulation 65

T0B02 @T0C10 (A)

What factors must you consider if your repeater station antenna will be located at a site that is occupied by antennas for transmitters in other services?

- A. Your radiated signal must be considered as part of the total RF radiation from the site when determining RF radiation exposure levels
- B. Each individual transmitting station at a multiple transmitter site must meet the RF radiation exposure levels
- C. Each station at a multiple-transmitter site may add no more than 1% of the maximum permissible exposure (MPE) for that site
- D. Amateur stations are categorically excluded from RF radiation exposure evaluation at multiple-transmitter sites

T0B03 @N0C05 (D)

To determine compliance with the maximum permitted exposure (MPE) levels, safe exposure levels for RF energy are averaged for an "uncontrolled" RF environment over what time period?

- A. 6 minutes
- B. 10 minutes
- C. 15 minutes
- D. 30 minutes

T0B04 @N0C06 (A)

To determine compliance with the maximum permitted exposure (MPE)

levels, safe exposure levels for RF energy are averaged for a "controlled" RF environment over what time period?

- A. 6 minutes
- B. 10 minutes
- C. 15 minutes
- D. 30 minutes

T0B05 @T0C11 (B)

Which of the following categories describes most common amateur use of a hand-held transceiver?

- A. Mobile devices
- B. Portable devices
- C. Fixed devices
- D. None of these choices is correct

T0B06 @N0C15 (A)

\*Modified A for new rules

How does an Amateur Radio operator demonstrate that he or she has read and understood the FCC rules about RF-radiation exposure?

- A. By indicating his or her understanding of this requirement on an amateur license application form at the time of application
- B. By posting a copy of Part 97 at the station
- C. By completing an FCC Environmental Assessment Form
- D. By completing an FCC Environmental Impact Statement

T0B07 @N0C01 (D)

What amateur stations must comply with the requirements for RF radiation exposure spelled out in Part 97?

- A. Stations with antennas that exceed 10 dBi of gain.
- B. Stations that have a duty cycle greater than 50 percent.
- C. Stations that run more than 50 watts peak envelope power (PEP)
- D. All amateur stations regardless of power

T0B08 @N0C02 (C)

Who is responsible for ensuring that an amateur station complies with FCC Rules about RF radiation exposure?

- A. The Federal Communications Commission
- B. The Environmental Protection Agency
- C. The licensee of the amateur station
- D. The Food and Drug Administration

T0B09 @T0B05 (C)

Why do exposure limits vary with frequency?

- A. Lower-frequency RF fields have more energy than higher-frequency fields
- B. Lower-frequency RF fields penetrate deeper into the body than higher-frequency fields
- C. The body's ability to absorb RF energy varies with frequency
- D. It is impossible to measure specific absorption rates at some frequencies

T0B10 @T0B06 (A)

Why is the concept of "duty cycle" one factor used to determine safe RF radiation exposure levels?

- A. It takes into account the amount of time the transmitter is operating at full power during a single transmission
- B. It takes into account the transmitter power supply rating

- C. It takes into account the antenna feed line loss
- D. It takes into account the thermal effects of the final amplifier

T0B11 @T0B11 (D)

From an RF safety standpoint, what impact does the duty cycle have on the minimum safe distance separating an antenna and the neighboring environment?

- A. The lower the duty cycle, the shorter the compliance distance
- B. The compliance distance is increased with an increase in the duty cycle
- C. Lower duty cycles subject the environment to lower radio-frequency radiation cycles
- D. All of these answers are correct

T0C Routine station evaluation (Practical applications for VHF/UHF and above operations)

T0C01 @T0D01 (A)

If you do not have the equipment to measure the RF power densities present at your station, what might you do to ensure compliance with the FCC RF radiation exposure limits?

- A. Use one or more of the methods included in the amateur supplement to FCC OET Bulletin 65
- B. Call an FCC-Certified Test Technician to perform the measurements for you
- C. Reduce power from 200 watts PEP to 100 watts PEP
- D. Operate only low-duty-cycle modes such as FM

T0C02 @T0D04 (D)

Is it necessary for you to perform mathematical calculations of the RF radiation exposure if your station transmits with more than 50 watts peak envelope power (PEP)?

- A. Yes, calculations are always required to ensure greatest accuracy
- B. Calculations are required if your station is located in a densely populated neighborhood
- C. No, calculations may not give accurate results, so measurements are always required
- D. No, there are alternate means to determine if your station meets the RF radiation exposure limits

T0C03 @N0E04 (B)

Why should you make sure the antenna of a hand-held transceiver is not too close to your head when transmitting?

- A. To help the antenna radiate energy equally in all directions
- B. To reduce your exposure to the radio-frequency energy
- C. To use your body to reflect the signal in one direction
- D. To keep electrostatic charges from harming the operator

T0C04 @N0E05 (A)

What should you do for safety if you put up a UHF transmitting antenna?

- A. Make sure the antenna will be in a place where no one can get near it when you are transmitting
- B. Make sure that RF field screens are in place
- C. Make sure the antenna is near the ground to keep its RF energy pointing in the correct direction
- D. Make sure you connect an RF leakage filter at the antenna feed

point

T0C05 @N0E06 (A)

How should you position the antenna of a hand-held transceiver while you are transmitting?

- A. Away from your head and away from others
- B. Towards the station you are contacting
- C. Away from the station you are contacting
- D. Down to bounce the signal off the ground

T0C06 @N0E07 (B)

Why should your antennas be located so that no one can touch them while you are transmitting?

- A. Touching the antenna might cause television interference
- B. Touching the antenna might cause RF burns
- C. Touching the antenna might cause it to radiate harmonics
- D. Touching the antenna might cause it to go into self-oscillation

T0C07 @T0E01 (B)

For the lowest RF radiation exposure to passengers, where would you mount your mobile antenna?

- A. On the trunk lid
- B. On the roof
- C. On a front fender opposite the broadcast radio antenna
- D. On one side of the rear bumper

T0C08 @T0E02 (C)

What should you do for safety before removing the shielding on a UHF power amplifier?

- A. Make sure all RF screens are in place at the antenna feed line
- B. Make sure the antenna feed line is properly grounded
- C. Make sure the amplifier cannot accidentally be turned on
- D. Make sure that RF leakage filters are connected

T0C09 @T0E03 (C)

Why might mobile transceivers produce less RF radiation exposure than hand-held transceivers in mobile operations?

- A. They do not produce less exposure because they usually have higher power levels.
- B. They have a higher duty cycle
- C. When mounted on a metal vehicle roof, mobile antennas are generally well shielded from vehicle occupants
- D. Larger transmitters dissipate heat and energy more readily

T0C10 @T0E04 (B)

What are some reasons you should never operate a power amplifier unless its covers are in place?

- A. To maintain the required high operating temperatures of the equipment and reduce RF radiation exposure
- B. To reduce the risk of shock from high voltages and reduce RF radiation exposure
- C. To ensure that the amplifier will go into self oscillation and to minimize the effects of stray capacitance
- D. To minimize the effects of stray inductance and to reduce the risk of shock from high voltages