

NCVEC Public Domain Errata of February 12,2018
FCC Exam Element 2 Question Pool for Technician Class
Effective 7/01/2018-6/30/2022

Errata #2 Release February 12,2018

T1B06 (B) Modified Distractors B.,C., and D.

On which HF bands does a Technician class operator have phone privileges?

- B. 10 meter band only
- C. 80 meter, 40 meter, 15 meter and 10 meter bands
- D. 30 meter band only

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T1B07-Modified Question; changed "frequencies" to frequency ranges

T1B10-Modified all distractors;

- A. 10 meter, 12 meter, 17 meter, and 40 meter bands
- B. 10 meter, 15 meter, 40 meter, and 80 meter bands
- C. 30 meter band only
- D. 10 meter band only

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T1B12-Distractor C; should read 500 "watts"

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T1E02-Distractor A and C; should be Amateur Extra "Class"

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T1E09-Distractor D; corrected to All "of" these choices are correct

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T2A01-Distractors A and D; Mhz corrected to "MHz" in both

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T2A03-Distractors A and D; Mhz corrected to "MHz" in both

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T2A11-Modified Question, new wording; What term describes an amateur station that is transmitting and receiving on the same frequency?

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T2B06-Modified distractor C. Changed Echolink to C. EchoLink

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T2C07-Distractor D; Corrected to All of "these" choices are correct

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T3A07-Distractor D; changed to Ferromagnetic

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T3A12-Modified question: How might fog and light rain affect radio range on the 10 "meter and" 6 "meter bands"?

Distractor D; Should read "Fog" and Rain.

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T3C06-Correct answer modified A. Tropospheric ducting

T3C06-Modified B. removed hyphen in D-layer

T3C06-Modified C. removed hyphen in F2-layer

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T3C07-Modified all distractors

- A. 10 meter band
- B. 6 meter band
- C. 2 meter band
- D. 70 centimeter band

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T3C10-Modified distractor A.,B., and C.

- A. 6 or 10 meter bands
- B. 23 centimeter band
- C. 70 centimeter or 1.25 meter bands

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T4A01-Modified Question wording; "transceiver", removed "'s"
T4A01-Distractor D; Corrected to All of these "choices" are correct
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T4A06-Distractor D: capitalized "DC"
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T4B Syllabus topics; removed repeater offsets, added "transceiver
operation"
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T4B11-DELETED Question.
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Renumbered last 3 questions in section T4B;
T4B12 to T4B11
T4B13 to T4B12
T4B14 to T4B13
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T5C13-Modified Question; What is a unit of impedance?
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T5D06-Distractor D: changed 8 Ohms to "8 ohms"
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T8B04 Question wording and all distractors modified to;
T8B04 (D) What mode of transmission is commonly used by amateur radio
satellites?
A. SSB
B. FM
C. CW/data
D. All of these choices are correct
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T8C10-Modified term Echolink to EchoLink in question and all
distractors
What must be done before you may use the EchoLink system to communicate
using a repeater?
A. You must complete the required EchoLink training
B. You must have purchased a license to use the EchoLink software
C. You must be sponsored by a current EchoLink user
D. You must register your call sign and provide proof of license
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T8D07-Modified Question; Removed "or Digital Migration Radio"
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T0B02-Distractor D: Removed "the" before the word these.
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~~ **End of Second Errata Release February 12,2018**~~

FCC Exam Element 2 Question Pool for Technician Class
Effective 7/01/2018-6/30/2022

SUBELEMENT T1 - FCC Rules, descriptions, and definitions for the
Amateur Radio Service, operator and station license responsibilities -
[6 Exam Questions - 6 Groups]

T1A - Amateur Radio Service: purpose and permissible use of the Amateur Radio Service, operator/primary station license grant; Meanings of basic terms used in FCC rules; Interference; RACES rules; Phonetics; Frequency Coordinator

T1A01 (C) [97.1]

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

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

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T1A02 (C) [97.1]

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

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

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T1A03 (D) [97.119(b)(2)]

What are the FCC rules regarding the use of a phonetic alphabet for station identification in the Amateur Radio Service?

- A. It is required when transmitting emergency messages
- B. It is prohibited
- C. It is required when in contact with foreign stations
- D. It is encouraged

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T1A04 (A) [97.5(b)(1)]

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

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

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T1A05 (C) [97.7]

What is proof of possession of an FCC-issued operator/primary license grant?

- A. A printed operator/primary station license issued by the FCC must be displayed at the transmitter site
- B. The control operator must have an operator/primary station license in his or her possession when in control of a transmitter
- C. The control operator's operator/primary station license must appear in the FCC ULS consolidated licensee database
- D. All of these choices are correct

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T1A06 (C) [97.3(a)(9)]

What is the FCC Part 97 definition of a beacon?

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

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T1A07 (C) [97.3(a)(41)]

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

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

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T1A08 (B) [97.3(a)(22)]

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

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

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T1A09 (C) [97.3(a)(22)]

Who selects a Frequency Coordinator?

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

~~

T1A10 (D) [97.3(a)(38), 97.407]

Which of the following describes the Radio Amateur Civil Emergency Service (RACES)?

- A. A radio service using amateur frequencies for emergency management or civil defense communications
- B. A radio service using amateur stations for emergency management or civil defense communications
- C. An emergency service using amateur operators certified by a civil defense organization as being enrolled in that organization
- D. All of these choices are correct

~~

T1A11 (B) [97.101 (d)]

When is willful interference to other amateur radio stations permitted?

- A. To stop another amateur station which is breaking the FCC rules
- B. At no time
- C. When making short test transmissions
- D. At any time, stations in the Amateur Radio Service are not protected from willful interference

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T1B - Authorized frequencies: frequency allocations; ITU; emission modes; restricted sub-bands; spectrum sharing; transmissions near band edges; contacting the International Space Station; power output

T1B01 (B)

What is the International Telecommunications Union (ITU)?

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

~~

T1B02 (B) [97.301, 97.207(c)]

Which amateur radio stations may make contact with an amateur radio station on the International Space Station (ISS) using 2 meter and 70 cm band frequencies?

- A. Only members of amateur radio clubs at NASA facilities
- B. Any amateur holding a Technician or higher-class license
- C. Only the astronaut's family members who are hams
- D. Contacts with the ISS are not permitted on amateur radio frequencies

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T1B03 (B) [97.301(a)]

Which frequency is within the 6 meter amateur band?

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

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T1B04 (A) [97.301(a)]

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

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

~~

T1B05 (B) [97.305(c)]

What is the limitation for emissions on the frequencies between 219 and 220 MHz?

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

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T1B06 (B) [97.301(e), 97.305]

On which HF bands does a Technician class operator have phone privileges?

- A. None

- B. 10 meter band only
- C. 80 meter, 40 meter, 15 meter and 10 meter bands
- D. 30 meter band only

~~

T1B07 (A) [97.305(a), (c)]

Which of the following VHF/UHF frequency ranges are limited to CW only?

- A. 50.0 MHz to 50.1 MHz and 144.0 MHz to 144.1 MHz
- B. 219 MHz to 220 MHz and 420.0 MHz to 420.1 MHz
- C. 902.0 MHz to 902.1 MHz
- D. All of these choices are correct

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T1B08 (A) [97.303]

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

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

~~

T1B09 (D) [97.101(a), 97.301(a-e)]

Why should you not set your transmit frequency to be exactly at the edge of an amateur band or sub-band?

- A. To allow for calibration error in the transmitter frequency display
- B. So that modulation sidebands do not extend beyond the band edge
- C. To allow for transmitter frequency drift
- D. All of these choices are correct

~~

T1B10 (D) [97.301(e), 97.305(c)]

Which of the following HF bands have frequencies available to the Technician class operator for RTTY and data transmissions?

- A. 10 meter, 12 meter, 17 meter, and 40 meter bands
- B. 10 meter, 15 meter, 40 meter, and 80 meter bands
- C. 30 meter band only
- D. 10 meter band only

~~

T1B11 (A) [97.313]

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

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

~~

T1B12 (D) [97.313(b)]

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

- A. 50 watts

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

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T1C - Operator licensing: operator classes; sequential and vanity call sign systems; international communications; reciprocal operation; places where the Amateur Radio Service is regulated by the FCC; name and address on FCC license database; license term; renewal; grace period

T1C01 (D) [97.9(a), 97.17(a)]

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

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

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T1C02 (D) [97.19]

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

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

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T1C03 (A) [97.117]

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

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

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T1C04 (A) [97.107]

When are you allowed to operate your amateur station in a foreign country?

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

~~

T1C05 (A)

Which of the following is a valid call sign for a Technician class amateur radio station?

- A. K1XXX
- B. KA1X
- C. W1XX
- D. All of these choices are correct

~~

T1C06 (D) [97.5(a)(2)]

From which of the following locations may an FCC-licensed amateur station transmit?

- A. From within any country that belongs to the International Telecommunications Union
- B. From within any country that is a member of the United Nations
- C. From anywhere within International Telecommunications Union (ITU) Regions 2 and 3
- D. From any vessel or craft located in international waters and documented or registered in the United States

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T1C07 (B) [97.23]

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

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

~~

T1C08 (C) [97.25]

What is the normal term for an FCC-issued primary station/operator amateur radio license grant?

- A. Five years
- B. Life
- C. Ten years
- D. Twenty years

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T1C09 (A) [97.21(a)(b)]

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

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

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T1C10 (C) [97.5a]

How soon after passing the examination for your first amateur radio license may you operate a transmitter on an Amateur Radio Service frequency?

- A. Immediately
- B. 30 days after the test date
- C. As soon as your operator/station license grant appears in the FCC's license database

D. You must wait until you receive your license in the mail from the FCC

~~

T1C11 (A) [97.21(b)]

If your license has expired and is still within the allowable grace period, may you continue to operate a transmitter on Amateur Radio Service frequencies?

- A. No, transmitting is not allowed until the FCC license database shows that the license has been renewed
- B. Yes, but only if you identify using the suffix GP
- C. Yes, but only during authorized nets
- D. Yes, for up to two years

~~

T1D - Authorized and prohibited transmission: communications with other countries; music; exchange of information with other services; indecent language; compensation for use of station; retransmission of other amateur signals; codes and ciphers; sale of equipment; unidentified transmissions; one-way transmission

T1D01 (A) [97.111(a)(1)]

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

- A. Any country whose administration has notified the International Telecommunications Union (ITU) that it objects to such communications
- B. Any country whose administration has notified the American Radio Relay League (ARRL) that it objects to such communications
- C. Any country engaged in hostilities with another country
- D. Any country in violation of the War Powers Act of 1934

~~

T1D02 (B) [97.113(b),97.111(b)]

Under which of the following circumstances may an amateur radio station make one-way transmissions?

- A. Under no circumstances
- B. When transmitting code practice, information bulletins, or transmissions necessary to provide emergency communications
- C. At any time, as long as no music is transmitted
- D. At any time, as long as the material being transmitted did not originate from a commercial broadcast station

~~

T1D03 (C) [97.211(b), 97.215(b), 97.114(a)(4)]

When is it permissible to transmit messages encoded to hide their meaning?

- A. Only during contests
- B. Only when operating mobile
- C. Only when transmitting control commands to space stations or radio control craft
- D. Only when frequencies above 1280 MHz are used

~~

T1D04 (A) [97.113(a)(4), 97.113(c)]

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

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

~~

T1D05 (A) [97.113(a)(3)(ii)]

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

- A. When the equipment is normally used in an amateur station and such activity is not conducted on a regular basis
- B. When the asking price is \$100.00 or less
- C. When the asking price is less than its appraised value
- D. When the equipment is not the personal property of either the station licensee or the control operator or their close relatives

~~

T1D06 (B) [97.113(a)(4)]

What, if any, are the restrictions concerning transmission of language that may be considered indecent or obscene?

- A. The FCC maintains a list of words that are not permitted to be used on amateur frequencies
- B. Any such language is prohibited
- C. The ITU maintains a list of words that are not permitted to be used on amateur frequencies
- D. There is no such prohibition

~~

T1D07 (B) [97.113(d)]

What types of amateur stations can automatically retransmit the signals of other amateur stations?

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

~~

T1D08 (B) [97.113(a)(3)(iii)]

In which of the following circumstances may the control operator of an amateur station receive compensation for operating that station?

- A. When the communication is related to the sale of amateur equipment by the control operator's employer
- B. When the communication is incidental to classroom instruction at an educational institution
- C. When the communication is made to obtain emergency information for a local broadcast station
- D. All of these choices are correct

~~

T1D09 (A) [97.113(5)(b)]

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

- A. Only where such communications directly relate to the immediate safety of human life or protection of property
- B. Only when broadcasting communications to or from the space shuttle

- C. Only where noncommercial programming is gathered and supplied exclusively to the National Public Radio network
- D. Only when using amateur repeaters linked to the internet

~~

T1D10 (D) [97.3(a)(10)]

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

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

~~

T1D11 (D) [97.119(a)]

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

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

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T1E - Control operator and control types: control operator required; eligibility; designation of control operator; privileges and duties; control point; local, automatic and remote control; location of control operator

T1E01 (D) [97.7(a)]

When is an amateur station permitted to transmit without a control operator?

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

~~

T1E02 (D) [97.301, 97.207(c)]

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

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

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T1E03 (A) [97.103(b)]

Who must designate the station control operator?

- A. The station licensee
- B. The FCC
- C. The frequency coordinator
- D. The ITU

~~

T1E04 (D) [97.103(b)]

What determines the transmitting privileges of an amateur station?

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

~~

T1E05 (C) [97.3(a)(14)]

What is an amateur station control point?

- A. The location of the station's transmitting antenna
- B. The location of the station transmitting apparatus
- C. The location at which the control operator function is performed
- D. The mailing address of the station licensee

~~

T1E06 (A) [97.301]

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

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

~~

T1E07 (D) [97.103(a)]

When the control operator is not the station licensee, who is responsible for the proper operation of the station?

- A. All licensed amateurs who are present at the operation
- B. Only the station licensee
- C. Only the control operator
- D. The control operator and the station licensee are equally responsible

~~

T1E08 (A) [97.3(a)(6), 97.205(d)]

Which of the following is an example of automatic control?

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

~~

T1E09 (D) [97.109(c)]

Which of the following is true of remote control operation?

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

~~

T1E10 (B) [97.3(a)(39)]

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

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

~~

T1E11 (D) [97.103(a)]

Who does the FCC presume to be the control operator of an amateur station, unless documentation to the contrary is in the station records?

- A. The station custodian
- B. The third-party participant
- C. The person operating the station equipment
- D. The station licensee

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T1F - Station identification; repeaters; third-party communications; club stations; FCC inspection

T1F01 (B) [97.103(c)]

When must the station licensee make the station and its records available for FCC inspection?

- A. At any time ten days after notification by the FCC of such an inspection
- B. At any time upon request by an FCC representative
- C. Only after failing to comply with an FCC notice of violation
- D. Only when presented with a valid warrant by an FCC official or government agent

~~

T1F02 (C) [97.119 (a)]

When using tactical identifiers such as "Race Headquarters" during a community service net operation, how often must your station transmit the station's FCC-assigned call sign?

- A. Never, the tactical call is sufficient
- B. Once during every hour
- C. At the end of each communication and every ten minutes during a communication
- D. At the end of every transmission

~~

T1F03 (D) [97.119(a)]

When is an amateur station required to transmit its assigned call sign?

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

~~

T1F04 (C) [97.119(b)(2)]

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

- A. Any language recognized by the United Nations
- B. Any language recognized by the ITU
- C. The English language

D. English, French, or Spanish

~~

T1F05 (B) [97.119(b)(2)]

What method of call sign identification is required for a station transmitting phone signals?

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

~~

T1F06 (D) [97.119(c)]

Which of the following formats of a self-assigned indicator is acceptable when identifying using a phone transmission?

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

~~

T1F07 (B) [97.115(a)(2)]

Which of the following restrictions apply when a non-licensed person is allowed to speak to a foreign station using a station under the control of a Technician class control operator?

- A. The person must be a U.S. citizen
- B. The foreign station must be one with which the U.S. has a third-party agreement
- C. The licensed control operator must do the station identification
- D. All of these choices are correct

~~

T1F08 (A) [97.3(a)(47)]

What is meant by the term Third Party Communications?

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

~~

T1F09 (C) [97.3(a)(40)]

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

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

~~

T1F10 (A) [97.205(g)]

Who is accountable should a repeater inadvertently retransmit communications that violate the FCC rules?

- A. The control operator of the originating station

- B. The control operator of the repeater
- C. The owner of the repeater
- D. Both the originating station and the repeater owner

~~

T1F11 (B) [97.5(b)(2)]

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

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

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SUBELEMENT T2 - Operating Procedures - [3 Exam Questions - 3 Groups]

T2A - Station operation: choosing an operating frequency; calling another station; test transmissions; procedural signs; use of minimum power; choosing an operating frequency; band plans; calling frequencies; repeater offsets

T2A01 (B)

Which of the following is a common repeater frequency offset in the 2 meter band?

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

~~

T2A02 (A)

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

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

~~

T2A03 (A)

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

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

~~

T2A04 (B)

What is an appropriate way to call another station on a repeater if you know the other station's call sign?

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

~~

T2A05 (C)

How should you respond to a station calling CQ?

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

~~

T2A06 (A)

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

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

~~

T2A07 (A)

What is meant by "repeater offset"?

- A. The difference between a repeater's transmit frequency and its receive frequency
- B. The repeater has a time delay to prevent interference
- C. The repeater station identification is done on a separate frequency
- D. The number of simultaneous transmit frequencies used by a repeater

~~

T2A08 (D)

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

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

~~

T2A09 (B)

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

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

~~

T2A10 (A)

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

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

~~

T2A11 (C)

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

- A. Full duplex
- B. Diplex

- C. Simplex
- D. Multiplex

~~

T2A12 (D)

Which of the following is a guideline when choosing an operating frequency for calling CQ?

- A. Listen first to be sure that no one else is using the frequency
- B. Ask if the frequency is in use
- C. Make sure you are in your assigned band
- D. All of these choices are correct

~~

T2B - VHF/UHF operating practices: SSB phone; FM repeater; simplex; splits and shifts; CTCSS; DTMF; tone squelch; carrier squelch; phonetics; operational problem resolution; Q signals

T2B01 (C)

What is the most common use of the "reverse split" function of a VHF/UHF transceiver?

- A. Reduce power output
- B. Increase power output
- C. Listen on a repeater's input frequency
- D. Listen on a repeater's output frequency

~~

T2B02 (D)

What term describes the use of a sub-audible tone transmitted along with normal voice audio to open the squelch of a receiver?

- A. Carrier squelch
- B. Tone burst
- C. DTMF
- D. CTCSS

~~

T2B03 (B)

If a station is not strong enough to keep a repeater's receiver squelch open, which of the following might allow you to receive the station's signal?

- A. Open the squelch on your radio
- B. Listen on the repeater input frequency
- C. Listen on the repeater output frequency
- D. Increase your transmit power

~~

T2B04 (D)

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

- A. Improper transceiver offset
- B. The repeater may require a proper CTCSS tone from your transceiver
- C. The repeater may require a proper DCS tone from your transceiver
- D. All of these choices are correct

~~

T2B05 (C)

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

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

~~

T2B06 (A)

What type of tones are used to control repeaters linked by the Internet Relay Linking Project (IRLP) protocol?

- A. DTMF
- B. CTCSS
- C. EchoLink
- D. Sub-audible

~~

T2B07 (C)

How can you join a digital repeater's "talk group"?

- A. Register your radio with the local FCC office
- B. Join the repeater owner's club
- C. Program your radio with the group's ID or code
- D. Sign your call after the courtesy tone

~~

T2B08 (A)

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

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

~~

T2B09 (B)

What is a "talk group" on a DMR digital repeater?

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

~~

T2B10 (A)

Which Q signal indicates that you are receiving interference from other stations?

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

~~

T2B11 (B)

Which Q signal indicates that you are changing frequency?

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

~~

T2B12 (A)

Why are simplex channels designated in the VHF/UHF band plans?

- A. So that stations within mutual communications range can communicate without tying up a repeater
- B. For contest operation
- C. For working DX only
- D. So that stations with simple transmitters can access the repeater without automated offset

~~

T2B13 (C)

Where may SSB phone be used in amateur bands above 50 MHz?

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

~~

T2B14 (A)

Which of the following describes a linked repeater network?

- A. A network of repeaters where signals received by one repeater are repeated by all the repeaters
- B. A repeater with more than one receiver
- C. Multiple repeaters with the same owner
- D. A system of repeaters linked by APRS

~~

T2C - Public service: emergency and non-emergency operations;
applicability of FCC rules; RACES and ARES; net and traffic procedures;
operating restrictions during emergencies

T2C01 (D) [97.103(a)]

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

- A. When operating a RACES station
- B. When operating under special FEMA rules
- C. When operating under special ARES rules
- D. Never, FCC rules always apply

~~

T2C02 (B)

What is meant by the term "NCS" used in net operation?

- A. Nominal Control System
- B. Net Control Station
- C. National Communications Standard
- D. Normal Communications Syntax

~~

T2C03 (C)

What should be done when using voice modes to ensure that voice messages containing unusual words are received correctly?

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

~~

T2C04 (D)

What do RACES and ARES have in common?

- A. They represent the two largest ham clubs in the United States
- B. Both organizations broadcast road and weather information
- C. Neither may handle emergency traffic supporting public service agencies
- D. Both organizations may provide communications during emergencies

~~

T2C05 (A)

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

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

~~

T2C06 (C)

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

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

~~

T2C07 (C)

Which of the following is an accepted practice for an amateur operator who has checked into a net?

- A. Provided that the frequency is quiet, announce the station call sign and location every 5 minutes
- B. Move 5 kHz away from the net's frequency and use high power to ask other hams to keep clear of the net frequency
- C. Remain on frequency without transmitting until asked to do so by the net control station
- D. All of these choices are correct

~~

T2C08 (A)

Which of the following is a characteristic of good traffic handling?

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

~~

T2C09 (D)

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

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

~~

T2C10 (D)

What information is contained in the preamble of a formal traffic message?

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

~~

T2C11 (A)

What is meant by the term "check," in reference to a formal traffic message?

- A. The number of words or word equivalents in the text portion of the message
- B. The value of a money order attached to the message
- C. A list of stations that have relayed the message
- D. A box on the message form that indicates that the message was received and/or relayed

~~

T2C12 (A)

What is the Amateur Radio Emergency Service (ARES)?

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

~~

SUBELEMENT T3 - Radio wave characteristics: properties of radio waves; propagation modes - [3 Exam Questions - 3 Groups]

T3A - Radio wave characteristics: how a radio signal travels; fading; multipath; polarization; wavelength vs absorption; antenna orientation

T3A01 (D)

What should you do if another operator reports that your station's 2 meter signals were strong just a moment ago, but now they are weak or distorted?

- A. Change the batteries in your radio to a different type
- B. Turn on the CTCSS tone

- C. Ask the other operator to adjust his squelch control
- D. Try moving a few feet or changing the direction of your antenna if possible, as reflections may be causing multi-path distortion

~~

T3A02 (B)

Why might the range of VHF and UHF signals be greater in the winter?

- A. Less ionospheric absorption
- B. Less absorption by vegetation
- C. Less solar activity
- D. Less tropospheric absorption

~~

T3A03 (C)

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

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

~~

T3A04 (B)

What can happen if the antennas at opposite ends of a VHF or UHF line of sight radio link are not using the same polarization?

- A. The modulation sidebands might become inverted
- B. Signals could be significantly weaker
- C. Signals have an echo effect on voices
- D. Nothing significant will happen

~~

T3A05 (B)

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

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

~~

T3A06 (B)

What term is commonly used to describe the rapid fluttering sound sometimes heard from mobile stations that are moving while transmitting?

- A. Flip-flopping
- B. Picket fencing
- C. Frequency shifting
- D. Pulsing

~~

T3A07 (A)

What type of wave carries radio signals between transmitting and receiving stations?

- A. Electromagnetic

- B. Electrostatic
- C. Surface acoustic
- D. Ferromagnetic

~~

T3A08 (C)

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

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

~~

T3A09 (B)

Which of the following results from the fact that skip signals refracted from the ionosphere are elliptically polarized?

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

~~

T3A10 (D)

What may occur if data signals arrive via multiple paths?

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

~~

T3A11 (C)

Which part of the atmosphere enables the propagation of radio signals around the world?

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

~~

T3A12 (B)

How might fog and light rain affect radio range on the 10 meter and 6 meter bands?

- A. Fog and rain absorb these wavelength bands
- B. Fog and light rain will have little effect on these bands
- C. Fog and rain will deflect these signals
- D. Fog and rain will increase radio range

~~

T3A13 (C)

What weather condition would decrease range at microwave frequencies?

- A. High winds

- B. Low barometric pressure
- C. Precipitation
- D. Colder temperatures

~~

T3B - Radio and electromagnetic wave properties: the electromagnetic spectrum; wavelength vs frequency; nature and velocity of electromagnetic waves; definition of UHF, VHF, HF bands; calculating wavelength

T3B01 (C)

What is the name for the distance a radio wave travels during one complete cycle?

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

~~

T3B02 (A)

What property of a radio wave is used to describe its polarization?

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

~~

T3B03 (C)

What are the two components of a radio wave?

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

~~

T3B04 (A)

How fast does a radio wave travel through free space?

- A. At the speed of light
- B. At the speed of sound
- C. Its speed is inversely proportional to its wavelength
- D. Its speed increases as the frequency increases

~~

T3B05 (B)

How does the wavelength of a radio wave relate to its frequency?

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

~~

T3B06 (D)

What is the formula for converting frequency to approximate wavelength in meters?

- A. Wavelength in meters equals frequency in hertz multiplied by 300

- B. Wavelength in meters equals frequency in hertz divided by 300
 - C. Wavelength in meters equals frequency in megahertz divided by 300
 - D. Wavelength in meters equals 300 divided by frequency in megahertz
- ~~

T3B07 (A)

What property of radio waves is often used to identify the different frequency bands?

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

T3B08 (B)

What are the frequency limits of the VHF spectrum?

- A. 30 to 300 kHz
 - B. 30 to 300 MHz
 - C. 300 to 3000 kHz
 - D. 300 to 3000 MHz
- ~~

T3B09 (D)

What are the frequency limits of the UHF spectrum?

- A. 30 to 300 kHz
 - B. 30 to 300 MHz
 - C. 300 to 3000 kHz
 - D. 300 to 3000 MHz
- ~~

T3B10 (C)

What frequency range is referred to as HF?

- A. 300 to 3000 MHz
 - B. 30 to 300 MHz
 - C. 3 to 30 MHz
 - D. 300 to 3000 kHz
- ~~

T3B11 (B)

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

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

T3C - Propagation modes: line of sight; sporadic E; meteor and auroral scatter and reflections; tropospheric ducting; F layer skip; radio horizon

T3C01 (C)

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

- A. They are too weak to go very far
- B. FCC regulations prohibit them from going more than 50 miles

- C. UHF signals are usually not reflected by the ionosphere
- D. UHF signals are absorbed by the ionospheric D layer

~~

T3C02 (C)

Which of the following is an advantage of HF vs VHF and higher frequencies?

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

~~

T3C03 (B)

What is a characteristic of VHF signals received via auroral reflection?

- A. Signals from distances of 10,000 or more miles are common
- B. The signals exhibit rapid fluctuations of strength and often sound distorted
- C. These types of signals occur only during winter nighttime hours
- D. These types of signals are generally strongest when your antenna is aimed west

~~

T3C04 (B)

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

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

~~

T3C05 (A)

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

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

~~

T3C06 (A)

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

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

~~

T3C07 (B)

What band is best suited for communicating via meteor scatter?

- A. 10 meter band
- B. 6 meter band
- C. 2 meter band

D. 70 centimeter band

~~

T3C08 (D)

What causes tropospheric ducting?

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

~~

T3C09 (A)

What is generally the best time for long-distance 10 meter band propagation via the F layer?

- A. From dawn to shortly after sunset during periods of high sunspot activity
- B. From shortly after sunset to dawn during periods of high sunspot activity
- C. From dawn to shortly after sunset during periods of low sunspot activity
- D. From shortly after sunset to dawn during periods of low sunspot activity

~~

T3C10 (A)

Which of the following bands may provide long distance communications during the peak of the sunspot cycle?

- A. 6 or 10 meter bands
- B. 23 centimeter band
- C. 70 centimeter or 1.25 meter bands
- D. All of these choices are correct

~~

T3C11 (C)

Why do VHF and UHF radio signals usually travel somewhat farther than the visual line of sight distance between two stations?

- A. Radio signals move somewhat faster than the speed of light
- B. Radio waves are not blocked by dust particles
- C. The Earth seems less curved to radio waves than to light
- D. Radio waves are blocked by dust particles

~~

SUBELEMENT T4 - Amateur radio practices and station set-up - [2 Exam Questions - 2 Groups]

T4A - Station setup: connecting microphones; reducing unwanted emissions; power source; connecting a computer; RF grounding; connecting digital equipment; connecting an SWR meter

T4A01 (D)

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

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

~~

T4A02 (D)

How might a computer be used as part of an amateur radio station?

- A. For logging contacts and contact information
- B. For sending and/or receiving CW
- C. For generating and decoding digital signals
- D. All of these choices are correct

~~

T4A03 (A)

Why should wiring between the power source and radio be heavy-gauge wire and kept as short as possible?

- A. To avoid voltage falling below that needed for proper operation
- B. To provide a good counterpoise for the antenna
- C. To avoid RF interference
- D. All of these choices are correct

~~

T4A04 (C)

Which computer sound card port is connected to a transceiver's headphone or speaker output for operating digital modes?

- A. Headphone output
- B. Mute
- C. Microphone or line input
- D. PCI or SDI

~~

T4A05 (A)

What is the proper location for an external SWR meter?

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

~~

T4A06 (C)

Which of the following connections might be used between a voice transceiver and a computer for digital operation?

- A. Receive and transmit mode, status, and location
- B. Antenna and RF power
- C. Receive audio, transmit audio, and push-to-talk (PTT)
- D. NMEA GPS location and DC power

~~

T4A07 (C)

How is a computer's sound card used when conducting digital communications?

- A. The sound card communicates between the computer CPU and the video display
- B. The sound card records the audio frequency for video display
- C. The sound card provides audio to the radio's microphone input and converts received audio to digital form
- D. All of these choices are correct

~~

T4A08 (D)

Which of the following conductors provides the lowest impedance to RF signals?

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

~~

T4A09 (D)

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

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

~~

T4A10 (B)

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

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

~~

T4A11 (A)

Where should the negative return connection of a mobile transceiver's power cable be connected?

- A. At the battery or engine block ground strap
- B. At the antenna mount
- C. To any metal part of the vehicle
- D. Through the transceiver's mounting bracket

~~

T4B - Operating controls: tuning; use of filters; squelch function; AGC; transceiver operation; memory channels

T4B01 (B)

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

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

~~

T4B02 (A)

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

- A. The keypad or VFO knob
- B. The CTCSS or DTMF encoder

- C. The Automatic Frequency Control
- D. All of these choices are correct

~~

T4B03 (D)

What is the purpose of the squelch control on a transceiver?

- A. To set the highest level of volume desired
- B. To set the transmitter power level
- C. To adjust the automatic gain control
- D. To mute receiver output noise when no signal is being received

~~

T4B04 (B)

What is a way to enable quick access to a favorite frequency on your transceiver?

- A. Enable the CTCSS tones
- B. Store the frequency in a memory channel
- C. Disable the CTCSS tones
- D. Use the scan mode to select the desired frequency

~~

T4B05 (C)

Which of the following would reduce ignition interference to a receiver?

- A. Change frequency slightly
- B. Decrease the squelch setting
- C. Turn on the noise blanker
- D. Use the RIT control

~~

T4B06 (D)

Which of the following controls could be used if the voice pitch of a single-sideband signal seems too high or low?

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

~~

T4B07 (B)

What does the term "RIT" mean?

- A. Receiver Input Tone
- B. Receiver Incremental Tuning
- C. Rectifier Inverter Test
- D. Remote Input Transmitter

~~

T4B08 (B)

What is the advantage of having multiple receive bandwidth choices on a multimode transceiver?

- A. Permits monitoring several modes at once
- B. Permits noise or interference reduction by selecting a bandwidth matching the mode
- C. Increases the number of frequencies that can be stored in memory
- D. Increases the amount of offset between receive and transmit frequencies

~~

T4B09 (C)

Which of the following is an appropriate receive filter bandwidth for minimizing noise and interference for SSB reception?

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

~~

T4B10 (A)

Which of the following is an appropriate receive filter bandwidth for minimizing noise and interference for CW reception?

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

~~

T4B11 (A)

What is the function of automatic gain control, or AGC?

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

~~

T4B12 (B)

Which of the following could be used to remove power line noise or ignition noise?

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

~~

T4B13 (C)

Which of the following is a use for the scanning function of an FM transceiver?

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

~~

SUBELEMENT T5 - Electrical principles: math for electronics; electronic principles; Ohm's Law - [4 Exam Questions - 4 Groups]

T5A - Electrical principles, units, and terms: current and voltage; conductors and insulators; alternating and direct current; series and parallel circuits

T5A01 (D)

Electrical current is measured in which of the following units?

- A. Volts

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

T5A02 (B)

Electrical power is measured in which of the following units?

- A. Volts
 - B. Watts
 - C. Ohms
 - D. Amperes
- ~~

T5A03 (D)

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

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

T5A04 (B)

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

- A. Alternating current
 - B. Direct current
 - C. Normal current
 - D. Smooth current
- ~

T5A05 (A)

What is the electrical term for the electromotive force (EMF) that causes electron flow?

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

T5A06 (A)

How much voltage does a mobile transceiver typically require?

- A. About 12 volts
 - B. About 30 volts
 - C. About 120 volts
 - D. About 240 volts
- ~~

T5A07 (C)

Which of the following is a good electrical conductor?

- A. Glass
 - B. Wood
 - C. Copper
 - D. Rubber
- ~~

T5A08 (B)

Which of the following is a good electrical insulator?

- A. Copper

- B. Glass
- C. Aluminum
- D. Mercury

~~

T5A09 (A)

What is the name for a current that reverses direction on a regular basis?

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

~~

T5A10 (C)

Which term describes the rate at which electrical energy is used?

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

~~

T5A11 (A)

What is the unit of electromotive force?

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

~~

T5A12 (D)

What describes the number of times per second that an alternating current makes a complete cycle?

- A. Pulse rate
- B. Speed
- C. Wavelength
- D. Frequency

~~

T5A13 (A)

In which type of circuit is current the same through all components?

- A. Series
- B. Parallel
- C. Resonant
- D. Branch

~~

T5A14 (B)

In which type of circuit is voltage the same across all components?

- A. Series
- B. Parallel
- C. Resonant
- D. Branch

~~

T5B - Math for electronics: conversion of electrical units; decibels; the metric system

T5B01 (C)

How many milliamperes is 1.5 amperes?

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

~~

T5B02 (A)

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

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

~~

T5B03 (C)

How many volts are equal to one kilovolt?

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

~~

T5B04 (A)

How many volts are equal to one microvolt?

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

~~

T5B05 (B)

Which of the following is equal to 500 milliwatts?

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

~~

T5B06 (C)

If an ammeter calibrated 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

~~

T5B07 (C)

If a frequency display calibrated in megahertz shows a reading of 3.525 MHz, what would it show if it were calibrated in kilohertz?

- A. 0.003525 kHz

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

~~

T5B08 (B)

How many microfarads are equal to 1,000,000 picofarads?

- A. 0.001 microfarads
- B. 1 microfarad
- C. 1000 microfarads
- D. 1,000,000,000 microfarads

~~

T5B09 (B)

What is the approximate amount of change, measured in decibels (dB), of a power increase from 5 watts to 10 watts?

- A. 2 dB
- B. 3 dB
- C. 5 dB
- D. 10 dB

~~

T5B10 (C)

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

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

~~

T5B11 (A)

What is the amount of change, measured in decibels (dB), of a power increase from 20 watts to 200 watts?

- A. 10 dB
- B. 12 dB
- C. 18 dB
- D. 28 dB

~~

T5B12 (A)

Which of the following frequencies is equal to 28,400 kHz?

- A. 28.400 MHz
- B. 2.800 MHz
- C. 284.00 MHz
- D. 28.400 kHz

~~

T5B13 (C)

If a frequency display shows a reading of 2425 MHz, what frequency is that in GHz?

- A. 0.002425 GHz
- B. 24.25 GHz
- C. 2.425 GHz
- D. 2425 GHz

~~

T5C - Electronic principles: capacitance; inductance; current flow in circuits; alternating current; definition of RF; definition of polarity; DC power calculations; impedance

T5C01 (D)

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

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

~~

T5C02 (A)

What is the basic unit of capacitance?

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

~~

T5C03 (D)

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

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

~~

T5C04 (C)

What is the basic unit of inductance?

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

~~

T5C05 (A)

What is the unit of frequency?

- A. Hertz
- B. Henry
- C. Farad
- D. Tesla

~~

T5C06 (A)

What does the abbreviation "RF" refer to?

- A. Radio frequency signals of all types
- B. The resonant frequency of a tuned circuit
- C. The real frequency transmitted as opposed to the apparent frequency
- D. Reflective force in antenna transmission lines

~~

T5C07 (B)

A radio wave is made up of what type of energy?

- A. Pressure
- B. Electromagnetic

- C. Gravity
- D. Thermal

~~

T5C08 (A)

What is the formula used to calculate electrical power in a DC circuit?

- A. Power (P) equals voltage (E) multiplied by current (I)
- B. Power (P) equals voltage (E) divided by current (I)
- C. Power (P) equals voltage (E) minus current (I)
- D. Power (P) equals voltage (E) plus current (I)

~~

T5C09 (A)

How much power is being used in a circuit when the applied voltage is 13.8 volts DC and the current is 10 amperes?

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

~~

T5C10 (B)

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

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

~~

T5C11 (B)

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

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

~~

T5C12 (A)

What is impedance?

- A. A measure of the opposition to AC current flow in a circuit
- B. The inverse of resistance
- C. The Q or Quality Factor of a component
- D. The power handling capability of a component

~~

T5C13 (D)

What is a unit of impedance?

- A. Volts
- B. Amperes
- C. Coulombs
- D. Ohms

~~

T5C14 (D)

What is the proper abbreviation for megahertz?

- A. mHz
- B. mhZ
- C. Mhz
- D. MHz

~~

T5D - Ohm's Law: formulas and usage; components in series and parallel

T5D01 (B)

What formula is used to calculate current in a circuit?

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

~~

T5D02 (A)

What formula is used to calculate voltage in a circuit?

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

~~

T5D03 (B)

What formula is used to calculate resistance in a circuit?

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

~~

T5D04 (B)

What is the resistance of a circuit in which a current of 3 amperes flows through a resistor connected to 90 volts?

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

~~

T5D05 (C)

What is the resistance in a circuit for which the applied voltage is 12 volts and the current flow is 1.5 amperes?

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

~~

T5D06 (A)

What is the resistance of a circuit that draws 4 amperes from a 12-volt source?

- A. 3 ohms
- B. 16 ohms

- C. 48 ohms
- D. 8 ohms

~~

T5D07 (D)

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

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

~~

T5D08 (C)

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

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

~~

T5D09 (C)

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

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

~~

T5D10 (A)

What is the voltage across a 2-ohm resistor if a current of 0.5 amperes flows through it?

- A. 1 volt
- B. 0.25 volts
- C. 2.5 volts
- D. 1.5 volts

~~

T5D11 (B)

What is the voltage across a 10-ohm resistor if a current of 1 ampere flows through it?

- A. 1 volt
- B. 10 volts
- C. 11 volts
- D. 9 volts

~~

T5D12 (D)

What is the voltage across a 10-ohm resistor if a current of 2 amperes flows through it?

- A. 8 volts
- B. 0.2 volts
- C. 12 volts
- D. 20 volts

~~

T5D13 (B)

What happens to current at the junction of two components in series?

- A. It divides equally between them
- B. It is unchanged
- C. It divides based on the on the value of the components
- D. The current in the second component is zero

~~

T5D14 (A)

What happens to current at the junction of two components in parallel?

- A. It divides between them dependent on the value of the components
- B. It is the same in both components
- C. Its value doubles
- D. Its value is halved

~~

T5D15 (C)

What is the voltage across each of two components in series with a voltage source?

- A. The same voltage as the source
- B. Half the source voltage
- C. It is determined by the type and value of the components
- D. Twice the source voltage

~~

T5D16 (D)

What is the voltage across each of two components in parallel with a voltage source?

- A. It is determined by the type and value of the components
- B. Half the source voltage
- C. Twice the source voltage
- D. The same voltage as the source

~~

SUBELEMENT T6 - Electrical components; circuit diagrams; component functions - [4 Exam Questions - 4 Groups]

T6A - Electrical components: fixed and variable resistors; capacitors and inductors; fuses; switches; batteries

T6A01 (B)

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

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

~~

T6A02 (C)

What type of component is often used as an adjustable volume control?

- A. Fixed resistor
- B. Power resistor
- C. Potentiometer
- D. Transformer

~~

T6A03 (B)

What electrical parameter is controlled by a potentiometer?

- A. Inductance
- B. Resistance
- C. Capacitance
- D. Field strength

~~

T6A04 (B)

What electrical component stores energy in an electric field?

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

~~

T6A05 (D)

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

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

~~

T6A06 (C)

What type of electrical component stores energy in a magnetic field?

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

~~

T6A07 (D)

What electrical component usually is constructed as a coil of wire?

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

~~

T6A08 (B)

What electrical component is used to connect or disconnect electrical circuits?

- A. Magnetron
- B. Switch
- C. Thermistor
- D. All of these choices are correct

~~

T6A09 (A)

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

- A. Fuse
- B. Capacitor
- C. Inductor

D. All of these choices are correct

~~

T6A10 (D)

Which of the following battery types is rechargeable?

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

~~

T6A11 (B)

Which of the following battery types is not rechargeable?

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

~~

T6B - Semiconductors: basic principles and applications of solid state devices; diodes and transistors

T6B01 (D)

What class of electronic components uses a voltage or current signal to control current flow?

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

~~

T6B02 (C)

What electronic component allows current to flow in only one direction?

- A. Resistor
- B. Fuse
- C. Diode
- D. Driven element

~~

T6B03 (C)

Which of these components can be used as an electronic switch or amplifier?

- A. Oscillator
- B. Potentiometer
- C. Transistor
- D. Voltmeter

~~

T6B04 (B)

Which of the following components can consist of three layers of semiconductor material?

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

~~

T6B05 (A)

Which of the following electronic components can amplify signals?

- A. Transistor
- B. Variable resistor
- C. Electrolytic capacitor
- D. Multi-cell battery

~~

T6B06 (B)

How is the cathode lead of a semiconductor diode often marked on the package?

- A. With the word "cathode"
- B. With a stripe
- C. With the letter C
- D. With the letter K

~~

T6B07 (B)

What does the abbreviation LED stand for?

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

~~

T6B08 (A)

What does the abbreviation FET stand for?

- A. Field Effect Transistor
- B. Fast Electron Transistor
- C. Free Electron Transmitter
- D. Frequency Emission Transmitter

~~

T6B09 (C)

What are the names of the two electrodes of a diode?

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

~~

T6B10 (B)

Which of the following could be the primary gain-producing component in an RF power amplifier?

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

~~

T6B11 (A)

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

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

~~

T6C - Circuit diagrams; schematic symbols

T6C01 (C)

What is the name of an electrical wiring diagram that uses standard component symbols?

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

~~

T6C02 (A)

What is component 1 in figure T1?

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

~~

T6C03 (B)

What is component 2 in figure T1?

- A. Resistor
- B. Transistor
- C. Indicator lamp
- D. Connector

~~

T6C04 (C)

What is component 3 in figure T1?

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

~~

T6C05 (C)

What is component 4 in figure T1?

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

~~

T6C06 (B)

What is component 6 in figure T2?

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

~~

T6C07 (D)

What is component 8 in figure T2?

- A. Resistor

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

~~

T6C08 (C)

What is component 9 in figure T2?

- A. Variable capacitor
- B. Variable inductor
- C. Variable resistor
- D. Variable transformer

~~

T6C09 (D)

What is component 4 in figure T2?

- A. Variable inductor
- B. Double-pole switch
- C. Potentiometer
- D. Transformer

~~

T6C10 (D)

What is component 3 in figure T3?

- A. Connector
- B. Meter
- C. Variable capacitor
- D. Variable inductor

~~

T6C11 (A)

What is component 4 in figure T3?

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

~~

T6C12 (A)

What do the symbols on an electrical schematic represent?

- A. Electrical components
- B. Logic states
- C. Digital codes
- D. Traffic nodes

~~

T6C13 (C)

Which of the following is accurately represented in electrical schematics?

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

~~

T6D - Component functions: rectification; switches; indicators; power supply components; resonant circuit; shielding; power transformers; integrated circuits

T6D01 (B)

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

- A. Transformer
- B. Rectifier
- C. Amplifier
- D. Reflector

~~

T6D02 (A)

What is a relay?

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

~~

T6D03 (A)

What type of switch is represented by component 3 in figure T2?

- A. Single-pole single-throw
- B. Single-pole double-throw
- C. Double-pole single-throw
- D. Double-pole double-throw

~~

T6D04 (C)

Which of the following displays an electrical quantity as a numeric value?

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

~~

T6D05 (A)

What type of circuit controls the amount of voltage from a power supply?

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

~~

T6D06 (B)

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

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

~~

T6D07 (A)

Which of the following is commonly used as a visual indicator?

- A. LED
- B. FET
- C. Zener diode
- D. Bipolar transistor

~~

T6D08 (D)

Which of the following is combined with an inductor to make a tuned circuit?

- A. Resistor
- B. Zener diode
- C. Potentiometer
- D. Capacitor

~~

T6D09 (C)

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

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

~~

T6D10 (C)

What is the function of component 2 in Figure T1?

- A. Give off light when current flows through it
- B. Supply electrical energy
- C. Control the flow of current
- D. Convert electrical energy into radio waves

~~

T6D11 (A)

Which of the following is a resonant or tuned circuit?

- A. An inductor and a capacitor connected in series or parallel to form a filter
- B. A type of voltage regulator
- C. A resistor circuit used for reducing standing wave ratio
- D. A circuit designed to provide high-fidelity audio

~~

T6D12 (C)

Which of the following is a common reason to use shielded wire?

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

~~

SUBELEMENT T7 - Station equipment: common transmitter and receiver problems; antenna measurements; troubleshooting; basic repair and testing - [4 Exam Questions - 4 Groups]

T7A - Station equipment: receivers; transmitters; transceivers; modulation; transverters; transmit and receive amplifiers

T7A01 (B)

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

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

~~

T7A02 (B)

What is a transceiver?

- A. A type of antenna switch
- B. A unit combining the functions of a transmitter and a receiver
- C. A component in a repeater that filters out unwanted interference
- D. A type of antenna matching network

~~

T7A03 (B)

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

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

~~

T7A04 (C)

Which term describes the ability of a receiver to discriminate between multiple signals?

- A. Discrimination ratio
- B. Sensitivity
- C. Selectivity
- D. Harmonic distortion

~~

T7A05 (D)

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

- A. Reactance modulator
- B. Product detector
- C. Low-pass filter
- D. Oscillator

~~

T7A06 (C)

What device converts the RF input and output of a transceiver to another band?

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

~~

T7A07 (D)

What is meant by "PTT"?

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

~~

T7A08 (C)

Which of the following describes combining speech with an RF carrier signal?

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

~~

T7A09 (B)

What is the function of the SSB/CW-FM switch on a VHF power amplifier?

- A. Change the mode of the transmitted signal
- B. Set the amplifier for proper operation in the selected mode
- C. Change the frequency range of the amplifier to operate in the proper portion of the band
- D. Reduce the received signal noise

~~

T7A10 (B)

What device increases the low-power output from a handheld transceiver?

- A. A voltage divider
- B. An RF power amplifier
- C. An impedance network
- D. All of these choices are correct

~~

T7A11 (A)

Where is an RF preamplifier installed?

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

~~

T7B - Common transmitter and receiver problems: symptoms of overload and overdrive; distortion; causes of interference; interference and consumer electronics; part 15 devices; over-modulation; RF feedback; off frequency signals

T7B01 (D)

What can you do if you are told your FM handheld 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

~~

T7B02 (A)

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

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

~~

T7B03 (D)

Which of the following can cause radio frequency interference?

- A. Fundamental overload
- B. Harmonics
- C. Spurious emissions
- D. All of these choices are correct

~~

T7B04 (D)

Which of the following is a way to reduce or eliminate interference from an amateur transmitter to a nearby telephone?

- A. Put a filter on the amateur transmitter
- B. Reduce the microphone gain
- C. Reduce the SWR on the transmitter transmission line
- D. Put an RF filter on the telephone

~~

T7B05 (A)

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

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

~~

T7B06 (A)

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

- A. Make sure that your station is functioning properly and that it does not cause interference to your own radio or television when it is tuned to the same channel
- B. Immediately turn off your transmitter and contact the nearest FCC office for assistance
- C. Tell them that your license gives you the right to transmit and nothing can be done to reduce the interference
- D. Install a harmonic doubler on the output of your transmitter and tune it until the interference is eliminated

~~

T7B07 (D)

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

- A. RF preamplifier

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

~~

T7B08 (D)

What should you do if something in a neighbor's home is causing harmful interference to your amateur station?

- A. Work with your neighbor to identify the offending device
- B. Politely inform your neighbor about the rules that prohibit the use of devices that cause interference
- C. Check your station and make sure it meets the standards of good amateur practice
- D. All of these choices are correct

~~

T7B09 (A)

What is a Part 15 device?

- A. An unlicensed device that may emit low-powered radio signals on frequencies used by a licensed service
- B. An amplifier that has been type-certified for amateur radio
- C. A device for long-distance communications using special codes sanctioned by the International Amateur Radio Union
- D. A type of test set used to determine whether a transmitter complies with FCC regulation 91.15

~~

T7B10 (D)

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

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

~~

T7B11 (C)

What is a symptom of RF feedback in a transmitter or transceiver?

- A. Excessive SWR at the antenna connection
- B. The transmitter will not stay on the desired frequency
- C. Reports of garbled, distorted, or unintelligible voice transmissions
- D. Frequent blowing of power supply fuses

~~

T7B12 (D)

What should be the first step to resolve cable TV interference from your ham radio transmission?

- A. Add a low-pass filter to the TV antenna input
- B. Add a high-pass filter to the TV antenna input
- C. Add a preamplifier to the TV antenna input
- D. Be sure all TV coaxial connectors are installed properly

~~

T7C - Antenna measurements and troubleshooting: measuring SWR; dummy loads; coaxial cables; causes of feed line failures

T7C01 (A)

What is the primary purpose of a dummy load?

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

~~

T7C02 (B)

Which of the following instruments can be used to determine if an antenna is resonant at the desired operating frequency?

- A. A VTVM
- B. An antenna analyzer
- C. A Q meter
- D. A frequency counter

~~

T7C03 (A)

What, in general terms, is standing wave ratio (SWR)?

- A. A measure of how well a load is matched to a transmission line
- B. The ratio of high to low impedance in a feed line
- C. The transmitter efficiency ratio
- D. An indication of the quality of your station's ground connection

~~

T7C04 (C)

What reading on an SWR meter indicates a perfect impedance match between the antenna and the feed line?

- A. 2 to 1
- B. 1 to 3
- C. 1 to 1
- D. 10 to 1

~~

T7C05 (A)

Why do most solid-state amateur radio transmitters reduce output power as SWR increases?

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

~~

T7C06 (D)

What does an SWR reading of 4:1 indicate?

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

~~

T7C07 (C)

What happens to power lost in a feed line?

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

~~

T7C08 (D)

What instrument other than an SWR meter could you use to determine if a feed line and antenna are properly matched?

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

~~

T7C09 (A)

Which of the following is the most common cause for failure of coaxial cables?

- A. Moisture contamination
- B. Gamma rays
- C. The velocity factor exceeds 1.0
- D. Overloading

~~

T7C10 (D)

Why should the outer jacket of coaxial cable be resistant to ultraviolet light?

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

~~

T7C11 (C)

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

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

~~

T7C12 (B)

What does a dummy load consist of?

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

~~

T7D - Basic repair and testing: soldering; using basic test instruments; connecting a voltmeter, ammeter, or ohmmeter

T7D01 (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

~~

T7D02 (B)

What is the correct way to connect a voltmeter to a circuit?

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

~~

T7D03 (A)

How is a simple ammeter connected to a circuit?

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

~~

T7D04 (D)

Which instrument is used to measure electric current?

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

~~

T7D05 (D)

What instrument is used to measure resistance?

- A. An oscilloscope
- B. A spectrum analyzer
- C. A noise bridge
- D. An ohmmeter

~~

T7D06 (C)

Which of the following might damage a multimeter?

- A. Measuring a voltage too small for the chosen scale
- B. Leaving the meter in the milliamps position overnight
- C. Attempting to measure voltage when using the resistance setting
- D. Not allowing it to warm up properly

~~

T7D07 (D)

Which of the following measurements are commonly made using a multimeter?

- A. SWR and RF power
- B. Signal strength and noise
- C. Impedance and reactance
- D. Voltage and resistance

~~

T7D08 (C)

Which of the following types of solder is best for radio and electronic use?

- A. Acid-core solder
- B. Silver solder

- C. Rosin-core solder
- D. Aluminum solder

~~

T7D09 (C)

What is the characteristic appearance of a cold solder joint?

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

~~

T7D10 (B)

What is probably happening when an ohmmeter, connected across an unpowered circuit, initially indicates a low resistance and then shows increasing resistance with time?

- A. The ohmmeter is defective
- B. The circuit contains a large capacitor
- C. The circuit contains a large inductor
- D. The circuit is a relaxation oscillator

~~

T7D11 (B)

Which of the following precautions should be taken when measuring circuit resistance with an ohmmeter?

- A. Ensure that the applied voltages are correct
- B. Ensure that the circuit is not powered
- C. Ensure that the circuit is grounded
- D. Ensure that the circuit is operating at the correct frequency

~~

T7D12 (B)

Which of the following precautions should be taken when measuring high voltages with a voltmeter?

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

~~

SUBELEMENT T8 - Modulation modes: amateur satellite operation; operating activities; non-voice and digital communications - [4 Exam Questions - 4 Groups]

T8A - Modulation modes: bandwidth of various signals; choice of emission type

T8A01 (C)

Which of the following is a form of amplitude modulation?

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

~~

T8A02 (A)

What type of modulation is most commonly used for VHF packet radio transmissions?

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

~~

T8A03 (C)

Which type of voice mode is most often used for long-distance (weak signal) contacts on the VHF and UHF bands?

- A. FM
- B. DRM
- C. SSB
- D. PM

~~

T8A04 (D)

Which type of modulation is most commonly used for VHF and UHF voice repeaters?

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

~~

T8A05 (C)

Which of the following types of emission has the narrowest bandwidth?

- A. FM voice
- B. SSB voice
- C. CW
- D. Slow-scan TV

~~

T8A06 (A)

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

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

~~

T8A07 (C)

What is an advantage of single sideband (SSB) over FM for voice transmissions?

- A. SSB signals are easier to tune
- B. SSB signals are less susceptible to interference
- C. SSB signals have narrower bandwidth
- D. All of these choices are correct

~~

T8A08 (B)

What is the approximate bandwidth of a single sideband (SSB) voice signal?

- A. 1 kHz

- B. 3 kHz
 - C. 6 kHz
 - D. 15 kHz
- ~~

T8A09 (C)

What is the approximate bandwidth of a VHF repeater FM phone signal?

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

T8A10 (B)

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

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

T8A11 (B)

What is the approximate maximum bandwidth required to transmit a CW signal?

- A. 2.4 kHz
 - B. 150 Hz
 - C. 1000 Hz
 - D. 15 kHz
- ~~

T8B - Amateur satellite operation; Doppler shift; basic orbits; operating protocols; transmitter power considerations; telemetry and telecommand; satellite tracking

T8B01 (C)

What telemetry information is typically transmitted by satellite beacons?

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

T8B02 (B)

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

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

T8B03 (D)

Which of the following are provided by satellite tracking programs?

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

~~

T8B04 (D)

What mode of transmission is commonly used by amateur radio satellites?

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

~~

T8B05 (D)

What is a satellite beacon?

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

~~

T8B06 (B)

Which of the following are inputs to a satellite tracking program?

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

~~

T8B07 (C)

With regard to satellite communications, what is Doppler shift?

- A. A change in the satellite orbit
- B. A mode where the satellite receives signals on one band and transmits on another
- C. An observed change in signal frequency caused by relative motion between the satellite and the earth station
- D. A special digital communications mode for some satellites

~~

T8B08 (B)

What is meant by the statement that a satellite is operating in mode U/V?

- A. The satellite uplink is in the 15 meter band and the downlink is in the 10 meter band
- B. The satellite uplink is in the 70 centimeter band and the downlink is in the 2 meter band
- C. The satellite operates using ultraviolet frequencies
- D. The satellite frequencies are usually variable

~~

T8B09 (B)

What causes spin fading of satellite signals?

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

~~

T8B10 (C)

What do the initials LEO tell you about an amateur satellite?

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

~~

T8B11 (A)

Who may receive telemetry from a space station?

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

~~

T8B12 (C)

Which of the following is a good way to judge whether your uplink power is neither too low nor too high?

- A. Check your signal strength report in the telemetry data
- B. Listen for distortion on your downlink signal
- C. Your signal strength on the downlink should be about the same as the beacon
- D. All of these choices are correct

~

T8C - Operating activities: radio direction finding; radio control; contests; linking over the internet; grid locators

T8C01 (C)

Which of the following methods is used to locate sources of noise interference or jamming?

- A. Echolocation
- B. Doppler radar
- C. Radio direction finding
- D. Phase locking

~~

T8C02 (B)

Which of these items would be useful for a hidden transmitter hunt?

- A. Calibrated SWR meter
- B. A directional antenna
- C. A calibrated noise bridge
- D. All of these choices are correct

~~

T8C03 (A)

What operating activity involves contacting as many stations as possible during a specified period?

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

~~

T8C04 (C)

Which of the following is good procedure when contacting another station in a radio contest?

- A. Sign only the last two letters of your call if there are many other stations calling
- B. Contact the station twice to be sure that you are in his log
- C. Send only the minimum information needed for proper identification and the contest exchange
- D. All of these choices are correct

~~

T8C05 (A)

What is a grid locator?

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

~~

T8C06 (B)

How is access to some IRLP nodes accomplished?

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

~~

T8C07 (D)

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

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

~~

T8C08 (A)

What is the Internet Radio Linking Project (IRLP)?

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

D. A technique for measuring signal strength of an amateur transmitter via the internet

~~

T8C09 (D)

How might you obtain a list of active nodes that use VoIP?

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

~~

T8C10 (D)

What must be done before you may use the EchoLink system to communicate using a repeater?

- A. You must complete the required EchoLink training
- B. You must have purchased a license to use the EchoLink software
- C. You must be sponsored by a current EchoLink user
- D. You must register your call sign and provide proof of license

~~

T8C11 (A)

What name is given to an amateur radio station that is used to connect other amateur stations to the internet?

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

~~

T8D - Non-voice and digital communications: image signals; digital modes; CW; packet radio; PSK31; APRS; error detection and correction; NTSC; amateur radio networking; Digital Mobile/Migration Radio

T8D01 (D)

Which of the following is a digital communications mode?

- A. Packet radio
- B. IEEE 802.11
- C. JT65
- D. All of these choices are correct

~~

T8D02 (A)

What does the term "APRS" mean?

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

~~

T8D03 (D)

Which of the following devices is used to provide data to the transmitter when sending automatic position reports from a mobile amateur radio station?

- A. The vehicle speedometer
- B. A WWV receiver
- C. A connection to a broadcast FM sub-carrier receiver
- D. A Global Positioning System receiver

~~

T8D04 (C)

What type of transmission is indicated by the term "NTSC?"

- A. A Normal Transmission mode in Static Circuit
- B. A special mode for earth satellite uplink
- C. An analog fast scan color TV signal
- D. A frame compression scheme for TV signals

~~

T8D05 (A)

Which of the following is an application of APRS (Automatic Packet Reporting System)?

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

~~

T8D06 (B)

What does the abbreviation "PSK" mean?

- A. Pulse Shift Keying
- B. Phase Shift Keying
- C. Packet Short Keying
- D. Phased Slide Keying

~~

T8D07 (A)

Which of the following best describes DMR (Digital Mobile Radio)?

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

~~

T8D08 (D)

Which of the following may be included in packet transmissions?

- A. A check sum that permits error detection
- B. A header that contains the call sign of the station to which the information is being sent
- C. Automatic repeat request in case of error
- D. All of these choices are correct

~~

T8D09 (C)

What code is used when sending CW in the amateur bands?

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

~~

T8D10 (D)

Which of the following operating activities is supported by digital mode software in the WSJT suite?

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

~~

T8D11 (C)

What is an ARQ transmission system?

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

~~

T8D12 (A)

Which of the following best describes Broadband-Hamnet(TM), also referred to as a high-speed multi-media network?

- A. An amateur-radio-based data network using commercial Wi-Fi gear with modified firmware
- B. A wide-bandwidth digital voice mode employing DRM protocols
- C. A satellite communications network using modified commercial satellite TV hardware
- D. An internet linking protocol used to network repeaters

~~

T8D13 (B)

What is FT8?

- A. A wideband FM voice mode
- B. A digital mode capable of operating in low signal-to-noise conditions that transmits on 15-second intervals
- C. An eight channel multiplex mode for FM repeaters
- D. A digital slow scan TV mode with forward error correction and automatic color compensation

~~

T8D14 (C)

What is an electronic keyer?

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

~~

T9A - Antennas: vertical and horizontal polarization; concept of gain; common portable and mobile antennas; relationships between resonant length and frequency; concept of dipole antennas

T9A01 (C)

What is a beam antenna?

- A. An antenna built from aluminum I-beams
- B. An omnidirectional antenna invented by Clarence Beam
- C. An antenna that concentrates signals in one direction
- D. An antenna that reverses the phase of received signals

~~

T9A02 (A)

Which of the following describes a type of antenna loading?

- A. Inserting an inductor in the radiating portion of the antenna to make it electrically longer
- B. Inserting a resistor in the radiating portion of the antenna to make it resonant
- C. Installing a spring in the base of a mobile vertical antenna to make it more flexible
- D. Strengthening the radiating elements of a beam antenna to better resist wind damage

~~

T9A03 (B)

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

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

~~

T9A04 (A)

What is a disadvantage of the "rubber duck" antenna supplied with most handheld radio transceivers when compared to a full-sized quarter-wave antenna?

- A. It does not transmit or receive as effectively
- B. It transmits only circularly polarized signals
- C. If the rubber end cap is lost, it will unravel very easily
- D. All of these choices are correct

~~

T9A05 (C)

How would you change a dipole antenna to make it resonant on a higher frequency?

- A. Lengthen it
- B. Insert coils in series with radiating wires
- C. Shorten it
- D. Add capacitive loading to the ends of the radiating wires

~~

T9A06 (C)

What type of antennas are the quad, Yagi, and dish?

- A. Non-resonant antennas
- B. Log periodic antennas
- C. Directional antennas
- D. Isotropic antennas

~~

T9A07 (A)

What is a disadvantage of using a handheld VHF transceiver, with its integral antenna, inside a vehicle?

- A. Signals might not propagate well due to the shielding effect of the vehicle
- B. It might cause the transceiver to overheat
- C. The SWR might decrease, decreasing the signal strength
- D. All of these choices are correct

~~

T9A08 (C)

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

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

~~

T9A09 (C)

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

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

~~

T9A10 (C)

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

- A. Equally in all directions
- B. Off the ends of the antenna
- C. Broadside to the antenna
- D. In the direction of the feed line

~~

T9A11 (C)

What is the gain of an antenna?

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

~~

T9A12 (A)

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

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

~~

T9B - Feed lines: types, attenuation vs frequency, selecting; SWR concepts; Antenna tuners (couplers); RF Connectors: selecting, weather protection

T9B01 (B)

Why is it important to have low SWR when using coaxial cable feed line?

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

~~

T9B02 (B)

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

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

~~

T9B03 (A)

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

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

~~

T9B04 (A)

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

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

~~

T9B05 (D)

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

- A. The characteristic impedance decreases
- B. The loss decreases

- C. The characteristic impedance increases
- D. The loss increases

~~

T9B06 (B)

Which of the following connectors is most suitable for frequencies above 400 MHz?

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

~~

T9B07 (C)

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

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

~~

T9B08 (A)

Why should coax connectors exposed to the weather be sealed against water intrusion?

- A. To prevent an increase in feed line loss
- B. To prevent interference to telephones
- C. To keep the jacket from becoming loose
- D. All of these choices are correct

~~

T9B09 (B)

What can cause erratic changes in SWR readings?

- A. The transmitter is being modulated
- B. A loose connection in an antenna or a feed line
- C. The transmitter is being over-modulated
- D. Interference from other stations is distorting your signal

~~

T9B10 (C)

What is the electrical difference between RG-58 and RG-8 coaxial cable?

- A. There is no significant difference between the two types
- B. RG-58 cable has two shields
- C. RG-8 cable has less loss at a given frequency
- D. RG-58 cable can handle higher power levels

~~

T9B11 (C)

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

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

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SUBELEMENT T0 - Electrical safety: AC and DC power circuits; antenna installation; RF hazards - [3 Exam Questions - 3 Groups]

T0A - Power circuits and hazards: hazardous voltages; fuses and circuit breakers; grounding; lightning protection; battery safety; electrical code compliance

T0A01 (B)

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

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

~~

T0A02 (D)

What health hazard is presented by electrical current flowing through the body?

- A. It may cause injury by heating tissue
- B. It may disrupt the electrical functions of cells
- C. It may cause involuntary muscle contractions
- D. All of these choices are correct

~~

T0A03 (C)

In the United States, what is connected to the green wire in a three-wire electrical AC plug?

- A. Neutral
- B. Hot
- C. Equipment ground
- D. The white wire

~~

T0A04 (B)

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

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

~~

T0A05 (C)

Why is it unwise to install a 20-ampere fuse in the place of a 5-ampere fuse?

- A. The larger fuse would be likely to blow because it is rated for higher current
- B. The power supply ripple would greatly increase
- C. Excessive current could cause a fire
- D. All of these choices are correct

~~

T0A06 (D)

What is a good way to guard against electrical shock at your station?

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

~~

T0A07 (D)

Which of these precautions should be taken when installing devices for lightning protection in a coaxial cable feed line?

- A. Include a parallel bypass switch for each protector so that it can be switched out of the circuit when running high power
- B. Include a series switch in the ground line of each protector to prevent RF overload from inadvertently damaging the protector
- C. Keep the ground wires from each protector separate and connected to station ground
- D. Mount all of the protectors on a metal plate that is in turn connected to an external ground rod

~~

T0A08 (A)

What safety equipment should always be included in home-built equipment that is powered from 120V AC power circuits?

- A. A fuse or circuit breaker in series with the AC hot conductor
- B. An AC voltmeter across the incoming power source
- C. An inductor in parallel with the AC power source
- D. A capacitor in series with the AC power source

~~

T0A09 (C)

What should be done to all external ground rods or earth connections?

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

~~

T0A10 (A)

What can happen if a lead-acid storage battery is charged or discharged too quickly?

- A. The battery could overheat, give off flammable gas, or explode
- B. The voltage can become reversed
- C. The memory effect will reduce the capacity of the battery
- D. All of these choices are correct

~~

T0A11 (D)

What kind of hazard might exist in a power supply when it is turned off and disconnected?

- A. Static electricity could damage the grounding system
- B. Circulating currents inside the transformer might cause damage
- C. The fuse might blow if you remove the cover
- D. You might receive an electric shock from the charge stored in large capacitors

~~

T0B - Antenna safety: tower safety and grounding; erecting an antenna support; safely installing an antenna

T0B01 (C)

When should members of a tower work team wear a hard hat and safety glasses?

- A. At all times except when climbing the tower
- B. At all times except when belted firmly to the tower
- C. At all times when any work is being done on the tower
- D. Only when the tower exceeds 30 feet in height

~~

T0B02 (C)

What is a good precaution to observe before climbing an antenna tower?

- A. Make sure that you wear a grounded wrist strap
- B. Remove all tower grounding connections
- C. Put on a carefully inspected climbing harness(fall arrester)and safety glasses
- D. All of these choices are correct

~~

T0B03 (D)

Under what circumstances is it safe to climb a tower without a helper or observer?

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

~~

T0B04 (C)

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

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

~~

T0B05 (C)

What is the purpose of a gin pole?

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

~~

T0B06 (D)

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

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

~~

T0B07 (C)

Which of the following is an important safety rule to remember when using a crank-up tower?

- A. This type of tower must never be painted

- B. This type of tower must never be grounded
- C. This type of tower must not be climbed unless retracted or mechanical safety locking devices have been installed
- D. All of these choices are correct

~~

T0B08 (C)

What is considered to be a proper grounding method for a tower?

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

~~

T0B09 (C)

Why should you avoid attaching an antenna to a utility pole?

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

~~

T0B10 (C)

Which of the following is true when installing grounding conductors used for lightning protection?

- A. Only non-insulated wire must be used
- B. Wires must be carefully routed with precise right-angle bends
- C. Sharp bends must be avoided
- D. Common grounds must be avoided

~~

T0B11 (B)

Which of the following establishes grounding requirements for an amateur radio tower or antenna?

- A. FCC Part 97 Rules
- B. Local electrical codes
- C. FAA tower lighting regulations
- D. UL recommended practices

~~

T0B12 (C)

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

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

~~

T0B13 (B)

What is the purpose of a safety wire through a turnbuckle used to tension guy lines?

- A. Secure the guy if the turnbuckle breaks

- B. Prevent loosening of the guy line from vibration
 - C. Prevent theft or vandalism
 - D. Deter unauthorized climbing of the tower
- ~~

T0C - RF hazards: radiation exposure; proximity to antennas; recognized safe power levels; exposure to others; radiation types; duty cycle

T0C01 (D)

What type of radiation are VHF and UHF radio signals?

- A. Gamma radiation
 - B. Ionizing radiation
 - C. Alpha radiation
 - D. Non-ionizing radiation
- ~~

T0C02 (B)

Which of the following frequencies has the lowest value for Maximum Permissible Exposure limit?

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

T0C03 (C)

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

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

T0C04 (D)

What factors affect the RF exposure of people near an amateur station antenna?

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

T0C05 (D)

Why do exposure limits vary with frequency?

- A. Lower frequency RF fields have more energy than higher frequency fields
 - B. Lower frequency RF fields do not penetrate the human body
 - C. Higher frequency RF fields are transient in nature
 - D. The human body absorbs more RF energy at some frequencies than at others
- ~~

T0C06 (D)

Which of the following is an acceptable method to determine that your station complies with FCC RF exposure regulations?

- A. By calculation based on FCC OET Bulletin 65
- B. By calculation based on computer modeling
- C. By measurement of field strength using calibrated equipment
- D. All of these choices are correct

~~

T0C07 (B)

What could happen if a person accidentally touched your antenna while you were transmitting?

- A. Touching the antenna could cause television interference
- B. They might receive a painful RF burn
- C. They might develop radiation poisoning
- D. All of these choices are correct

~~

T0C08 (A)

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

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

~~

T0C09 (B)

How can you make sure your station stays in compliance with RF safety regulations?

- A. By informing the FCC of any changes made in your station
- B. By re-evaluating the station whenever an item of equipment is changed
- C. By making sure your antennas have low SWR
- D. All of these choices are correct

~~

T0C10 (A)

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

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

~~

T0C11 (C)

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

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

~~

T0C12 (A)

How does RF radiation differ from ionizing radiation (radioactivity)?

- A. RF radiation does not have sufficient energy to cause genetic damage
- B. RF radiation can only be detected with an RF dosimeter
- C. RF radiation is limited in range to a few feet
- D. RF radiation is perfectly safe

~~

T0C13 (C)

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

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

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END OF Questions

3 Diagrams required for examinations - pgs 73-75

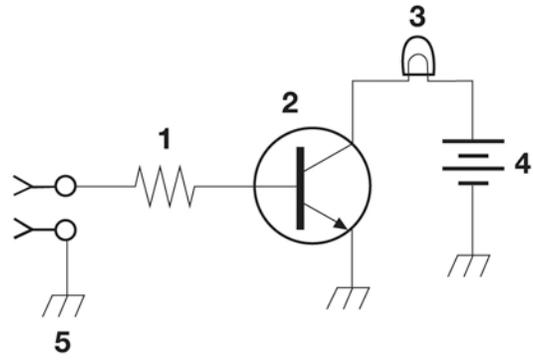


Figure T-1

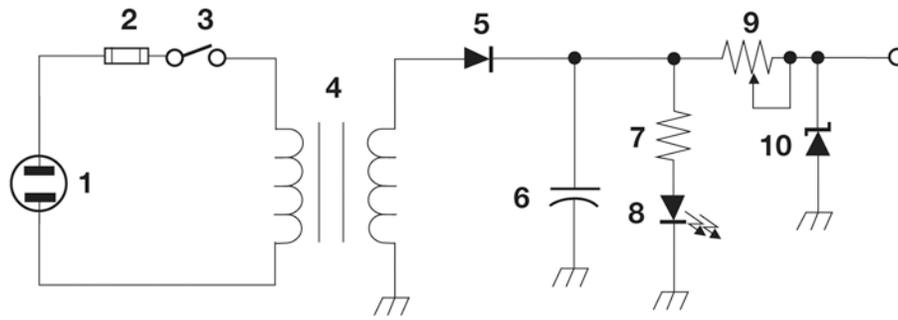


Figure T-2

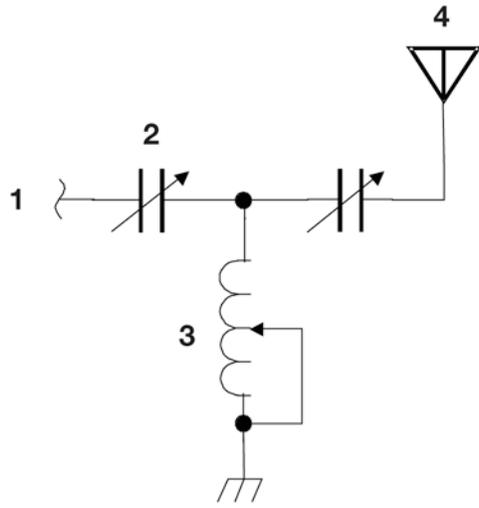


Figure T-3