

10. When are communications pertaining to business or commercial affairs of any party permitted in the amateur service?
- A. Only when the immediate safety of human life or immediate protection of property is threatened
  - B. There are no rules against conducting business communications in the amateur service
  - C. No business communications of any kind are ever permitted in the amateur service
  - D. Business communications are permitted between the hours of 9 AM to 5 PM, only on weekdays
11. What is one meaning of the Q signal "QTH"?
- A. Time here is
  - B. My name is
  - C. Stop sending
  - D. My location is ...
12. What is the meaning of the Morse code character AR?
- A. Only the called station transmit
  - B. All received correctly
  - C. "Over" or End of transmission
  - D. Best regards
13. What type of propagation uses radio signals refracted back to earth by the ionosphere?
- A. Sky wave
  - B. Earth-moon-earth
  - C. Ground wave
  - D. Tropospheric
14. Why should all antenna and rotator cables be grounded when an amateur station is not in use?
- A. To lock the antenna system in one position
  - B. To avoid radio frequency interference
  - C. To save electricity
  - D. To protect the station and building from damage due to a nearby lightning strike
15. If you are notified that your amateur station is causing television interference, what should you do first?
- A. Make sure that your amateur equipment is operating properly, and that it does not cause interference to your own television
  - B. Immediately turn off your transmitter and contact the nearest FCC office for assistance
  - C. Install a high-pass filter at the transmitter output and a low-pass filter at the antenna-input terminals of the TV
  - D. Continue operating normally, since you have no legal obligation to reduce or eliminate the interference
16. What precautions should you take before removing the shielding on a UHF power amplifier?
- A. Make sure all RF screens are in place at the antenna
  - B. Make sure the feed line is properly grounded
  - C. Make sure the amplifier cannot be accidentally energized
  - D. Make sure that the RF leakage filters are connected
17. What instrument is used to indicate the relative impedance match between a transmitter and antenna?
- A. An ammeter
  - B. An ohmmeter
  - C. A voltmeter
  - D. An SWR meter
18. List at least four good electrical insulators.
- A. Glass, air, plastic, porcelain
  - B. Glass, wood, copper, porcelain
  - C. Paper, glass, air, aluminum
  - D. Plastic, rubber, wood, carbon
19. Signals above what frequency are usually called radio-frequency signals?
- A. 20 Hz
  - B. 2000 Hz
  - C. 20,000 Hz
  - D. 1,000,000 Hz
20. Your receiver dial is calibrated in megahertz and shows a signal at 3.525 MHz. At what frequency would a dial calibrated in kilohertz show the signal?
- A. 0.003525 kHz
  - B. 3525 kHz
  - C. 35.25 kHz
  - D. 3,525,000 kHz
21. What is the term used to describe a current that flows first in one direction, then in the opposite direction, over and over?
- A. Alternating current
  - B. Direct current
  - C. Negative current
  - D. Positive current

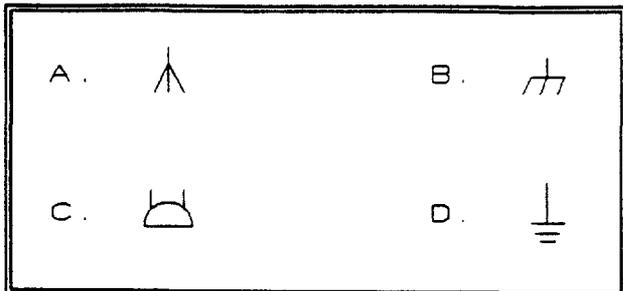


Diagram 2F-5.1

22. What is the symbol normally used to represent an earth-ground connection on schematic diagrams? (Please refer to Diagram 2F-5.1)

- A. Symbol A
- B. Symbol B
- C. Symbol C
- D. Symbol D

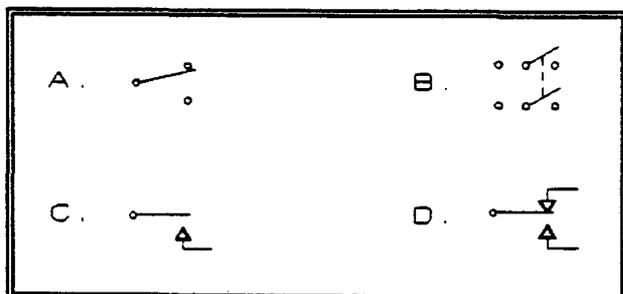


Diagram 2F-2.3

23. What is the symbol used on schematic diagrams to represent a double-pole, double-throw switch? (Please refer to Diagram 2F-2.3)

- A. Symbol A
- B. Symbol B
- C. Symbol C
- D. Symbol D

24. In an amateur station designed for Morse radiotelegraph operation, what station accessory will you need to go with your transmitter?

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

25. You discover that your tube-type transmitter power amplifier is radiating spurious emissions. What is the most likely cause of this problem?

- A. Excessively fast keying speed
- B. Undermodulation
- C. Improper neutralization
- D. Tank-circuit current dip at resonance

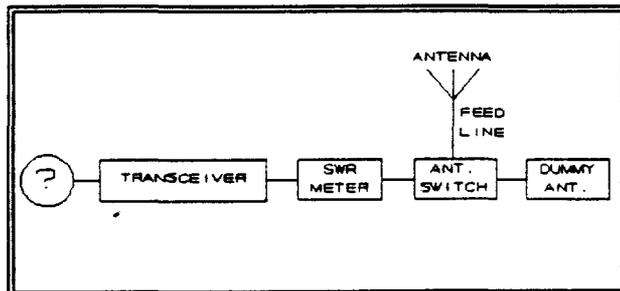


Diagram 2G-3.2

26. What is the unlabeled block (?) in this diagram of a radiotelephone station? (Please refer to Diagram 2G-3.2)

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

27. What can be done to the power supply of a CW transmitter to avoid chirp?

- A. Resonate the power supply filters
- B. Regulate the power supply output voltages
- C. Use a buffer amplifier between the transmitter output and the feed line
- D. Hold the power supply current to a fixed value

28. On the Yagi antenna shown in Figure 2I-4, what is the name of section C?

- A. Director
- B. Reflector
- C. Boom
- D. Driven element

29. How is the approximate length (in feet) of a half-wavelength dipole antenna calculated?

- A. By substituting the desired operating frequency for  $f$  in the formula:  $150 / f$  (in MHz)
- B. By substituting the desired operating frequency for  $f$  in the formula:  $234 / f$  (in MHz)
- C. By substituting the desired operating frequency for  $f$  in the formula:  $300 / f$  (in MHz)
- D. By substituting the desired operating frequency for  $f$  in the formula:  $468 / f$  (in MHz)

30. A certain antenna system has an impedance of 1000 ohms on one band. What must you use to connect this antenna system to the 50-ohm output on your transmitter?

- A. A balun
- B. An SWR bridge
- C. An impedance matching device
- D. A low-pass filter

1. Under what circumstances does the FCC declare a temporary state of communication emergency?
  - A. When a declaration of war is received from Congress
  - B. When the maximum usable frequency goes above 28 MHz
  - C. When communications facilities in Washington, DC, are disrupted
  - D. When a disaster disrupts normal communications systems in a particular area
2. In an exchange of international third-party communications, when is the station identification procedure required?
  - A. Only at the beginning of the communications
  - B. At the end of each exchange of communications
  - C. The station identification procedure is not required during international third party communications
  - D. Only at the end of multiple exchanges of communications
3. Which operator licenses authorize privileges on 52.525 MHz?
  - A. Extra, Advanced only
  - B. Extra, Advanced, General only
  - C. Extra, Advanced, General, Technician only
  - D. Extra, Advanced, General, Technician, Novice
4. What are the station identification requirements for an amateur station transmitting signals to control a model craft?
  - A. Once every ten minutes, and at the beginning and end of each transmission
  - B. Once every ten minutes
  - C. At the beginning and end of each transmission
  - D. Station identification is not required provided that a label indicating the station call sign and the station licensee's name and address is affixed to the station transmitter
5. Notwithstanding the numerical limitations in the FCC Rules, how much transmitting power shall be used by an amateur station?
  - A. There is no regulation other than the numerical limits
  - B. The minimum power level required to achieve S9 signal reports
  - C. The minimum power necessary to carry out the desired communication
  - D. The maximum power available, as long as it is under the allowable limit 3AA-6-3.1 D What is the maximum transmitting power permitted an amateur station on 146.52 MHz?
6. What is the meaning of: "Your report is five seven..."?
  - A. Your signal is perfectly readable and moderately strong
  - B. Your signal is perfectly readable, but weak
  - C. Your signal is readable with considerable difficulty
  - D. Your signal is perfectly readable with near pure tone
7. What is the term used to describe first-response communications in an emergency situation?
  - A. Tactical communications
  - B. Emergency communications
  - C. Formal message traffic
  - D. National Traffic System messages
8. What is the usual input/output frequency separation for stations in repeater operation in the 2-meter band?
  - A. 1 MHz
  - B. 1.6 MHz
  - C. 170 Hz
  - D. 0.6 MHz
9. What effect does tropospheric bending have on 2-meter radio waves?
  - A. It increases the distance over which they can be transmitted
  - B. It decreases the distance over which they can be transmitted
  - C. It tends to garble 2-meter phone transmissions
  - D. It reverses the sideband of 2-meter phone transmissions
10. What are the two distinct sub-layers of the F layer of the ionosphere during the daytime?
  - A. Troposphere and stratosphere
  - B. F1 and F2
  - C. Electrostatic and electromagnetic
  - D. D and E
11. How are VHF signals within the range of the visible horizon propagated?
  - A. By sky wave
  - B. By direct wave
  - C. By plane wave
  - D. By geometric wave
12. What is the purpose of the ANSI RF protection guide?
  - A. It protects you from unscrupulous radio dealers
  - B. It sets RF exposure limits under certain circumstances
  - C. It sets transmitter power limits
  - D. It sets antenna height requirements

13. What is a multimeter?
- An instrument capable of reading SWR and power
  - An instrument capable of reading resistance, capacitance and inductance
  - An instrument capable of reading resistance and reactance
  - An instrument capable of reading voltage, current and resistance
14. When adjusting a transmitter filter circuit, what device is connected to the transmitter output?
- A multimeter
  - A set of Litz wires
  - A receiver
  - A dummy antenna
15. What is a directional wattmeter?
- An instrument that measures forward or reflected power
  - An instrument that measures the directional pattern of an antenna
  - An instrument that measures the energy consumed by the transmitter
  - An instrument that measures thermal heating in a load resistor
16. What is a microfarad?
- A basic unit of capacitance equal to  $10^{-12}$  farads
  - A basic unit of capacitance equal to  $10^{-6}$  farads
  - A basic unit of capacitance equal to  $10^{-2}$  farads
  - A basic unit of capacitance equal to  $10^6$  farads
17. What is Ohm's Law?
- A mathematical relationship between resistance, voltage and power in a circuit
  - A mathematical relationship between current, resistance and power in a circuit
  - A mathematical relationship between current, voltage and power in a circuit
  - A mathematical relationship between resistance, current and applied voltage in a circuit
18. What are the electrical properties of an inductor?
- An inductor stores a charge electrostatically and opposes a change in voltage
  - An inductor stores a charge electrochemically and opposes a change in current
  - An inductor stores a charge electromagnetically and opposes a change in current
  - An inductor stores a charge electromechanically and opposes a change in voltage
19. What is a capacitor dielectric?
- The insulating material used for the plates
  - The conducting material used between the plates
  - The ferrite material that the plates are mounted on
  - The insulating material between the plates
20. What circuit attenuates electrical energy above a certain frequency and below a lower frequency?
- A band-pass filter
  - A high-pass filter
  - An input filter
  - A low-pass filter
21. If the modulator circuit of your FM transmitter fails, what emission type would likely result?
- An unmodulated carrier wave
  - A phase-modulated carrier wave
  - An amplitude-modulated carrier wave
  - A frequency-modulated carrier wave
22. What other emission does phase modulation most resemble?
- Amplitude modulation
  - Pulse modulation
  - Frequency modulation
  - Single-sideband modulation
23. What type of parasitic beam antenna uses two or more straight metal-tubing elements arranged physically parallel to each other?
- A delta loop antenna
  - A quad antenna
  - A Yagi antenna
  - A Zepp antenna
24. What is a balanced antenna?
- A symmetrical antenna with one side of the feed point connected to ground
  - An antenna (or a driven element in an array) that is symmetrical about the feed point
  - A symmetrical antenna with both sides of the feed point connected to ground, to balance out harmonics
  - An antenna designed to be mounted in the center
25. How can you minimize exposure to radio frequency energy from your transmitting antennas?
- Use vertical polarization
  - Use horizontal polarization
  - Mount the antennas where no one can come near them
  - Mount the antenna close to the ground

8/24/91 - Novice

370 questions in Novice pool  
(includes one that was  
withdrawn but included  
in the test)

154 reviewed 41.6%

216 not reviewed 58.4%

## Chapter 12

# Element 2 Question Pool

## —With Answers

### — DON'T START HERE —

This chapter contains the complete question pool for the Element 2 exam. Element 2 is the written part of the Novice exam, and is also part of the Technician exam. The Technician exam also includes Element 3A. Chapter 13 contains the entire Element 3A question pool, with answers. To obtain a Novice license you must also pass a 5-WPM Morse code test. The Technician license does not require a code test.

Before you read the questions and answers printed in this chapter, be sure to read the text in the previous chapters. Use these questions as review exercises, when the text tells you to study them. Don't try to memorize all the questions and answers. This book was carefully written and prepared to guide you step by step as you learn about Amateur Radio. By understanding the electronics principles and Amateur Radio concepts in this book, you will enjoy our hobby more. You will also better appreciate the privileges granted by an Amateur Radio license.

This pool will be used until further notice from the Volunteer Examiner Coordinator's Question Pool Committee.

#### HOW MANY QUESTIONS?

Your Element 2 exam will consist of 30 of these questions, selected by the Volunteer Examiners giving you the test. The ARRL/VEC and most other VECs have agreed to use the multiple-choice answers. Some VECs may use the questions printed here with different answers and/or distractors (incorrect answers).

#### WHO GIVES THE TEST?

You may take your exam at a session coordinated by a Volunteer Examiner Coordinator. If so, check with that VEC to find out if they use these multiple-choice answers.

You might also take your Element 2 exam from two Volunteer Examiners with General class or higher licenses, but who are not part of the VEC program. These examiners must still use the questions exactly as printed. They may choose other answer formats, however. Ask your examiners what answer format they will use before you take the exam. Note that *only* the Novice license exam may be given by examiners who are not registered with a Volunteer Examiner program.

Volunteer Examiners for Novice licenses can request a Novice exam from the Educational Activities Department at ARRL Headquarters. They should include their own call signs, license classes and expiration dates, so the staff can verify that they are eligible to give the exam. If your examiners select the questions for your exam, we recommend the multiple-choice answers printed in this chapter. They have been carefully worded to provide the best answer and good distractors for each question. The examiners are free to choose

another answer format, such as fill-in-the-blank or even to give an oral exam, however.

#### QUESTION POOL SECTIONS

The question pool is divided into nine sections, called subelements. (A subelement is a portion of the exam element, in this case Element 2.) The FCC specifies how many questions from each section must be on your test. For example, there must be ten questions from the Commission's Rules section, Subelement 2A. There must also be two questions from the Operating Procedures section, Subelement 2B, and so on. Table 12-1 summarizes the number of questions that make up an exam. The number of questions on an exam appears at the beginning of each subelement in the question pool, too. The subelements are broken into smaller groups, with one question specified to come from each smaller group. These sections are clearly shown in the questions pool.

Table 12-1  
Novice Exam Content

Subelement	Topic	Number of questions
2A	Commission's Rules	10
2B	Operating Procedures	2
2C	Radio-Wave Propagation	1
2D	Amateur Radio Practices	4
2E	Electrical Principles	4
2F	Circuit Components	2
2G	Practical Circuits	2
2H	Signals and Emissions	2
2I	Antennas and Feed Lines	3

The question numbers used in the question pool relate to the syllabus or study guide printed at the end of Chapter 1. The syllabus is an outline of topics covered by the exam. The first part of each question number (up to the decimal point) lists the syllabus point covered by that question. The number after the decimal point identifies the individual questions that go with that point. For example, question 2C-4.2 is the second question in the series about syllabus point 2C-4, sunspot cycle.

Good luck with your studies.

#### Withdrawn Questions

FCC Rules changes sometimes make it necessary to withdraw certain questions from the pool. Withdrawn questions are noted in the following pages.

*Pg. # indicates page # of my notes where subject matter was discussed*  
*# indicates no review of material.*  
*Q # indicates # on test*  
 8-24-91

One question must be from the following:

- 2A-1.1 What are the five principles that express the fundamental purpose for which the amateur service rules are designed?
- A. Recognition of emergency communications, advancement of the radio art, improvement of communication and technical skills, increase in the number of trained radio operators and electronics experts, and the enhancement of international goodwill
  - B. Recognition of business communications, advancement of the radio art, improvement of communication and business skills, increase in the number of trained radio operators and electronics experts, and the enhancement of international goodwill
  - C. Recognition of emergency communications, preservation of the earliest radio techniques, improvement of communication and technical skills, maintain a pool of people familiar with early tube-type equipment, and the enhancement of international goodwill
  - D. Recognition of emergency communications, advancement of the radio art, improvement of communication and technical skills, increase in the number of trained radio operators and electronics experts, and the enhancement of a sense of patriotism

- 2A-1.2 Which of the following is *not* one of the basic principles for which the *amateur service* rules are designed?
- A. Providing emergency communications
  - B. Improvement of communication and technical skills
  - C. Advancement of the radio art
  - D. Enhancement of a sense of patriotism and nationalism

- 2A-1.3 The amateur service rules were designed to provide a radio communications service that meets five fundamental purposes. Which of the following is *not* one of those principles?
- A. Improvement of communication and technical skills
  - B. Enhancement of international goodwill
  - C. Increase the number of trained radio operators and electronics experts
  - D. Preserving the history of radio communications

2A-1.4 The amateur service rules were designed to provide a radio communications service that meets five fundamental purposes. What are those principles?

- A. Recognition of business communications, advancement of the radio art, improvement of communication and business skills, increase in the number of trained radio operators and electronics experts, and the enhancement of international goodwill
- B. Recognition of emergency communications, advancement of the radio art, improvement of communication and technical skills, increase in the number of trained radio operators and electronics experts, and the enhancement of international goodwill
- C. Recognition of emergency communications, preservation of the earliest radio techniques, improvement of communication and technical skills, maintain a pool of people familiar with early tube-type equipment, and the enhancement of international goodwill
- D. Recognition of emergency communications, advancement of the radio art, improvement of communication and technical skills, increase in the number of trained radio operators and electronics experts, and the enhancement of a sense of patriotism

- 2A-2.1 What is the definition of the *amateur service*?
- A. A private radio service used for personal gain and public benefit
  - B. A public radio service used for public service communications
  - C. A radio communication service for the purpose of self-training, intercommunication and technical investigations
  - D. A private radio service intended for the furtherance of commercial radio interests

- 2A-2.2 What name is given to the radio communication service that is designed for self-training, intercommunication, and technical investigation?
- A. The amateur service
  - B. The Citizen's Radio Service
  - C. The Experimenter's Radio Service
  - D. The Maritime Radio Service

- 2A-3.1 What document contains the specific rules and regulations governing the amateur service in the United States?
- A. Part 97 of title 47 CFR (Code of Federal Regulations)
  - B. The Communications Act of 1934 (as amended)
  - C. The Radio Amateur's Handbook
  - D. The minutes of the International Telecommunication Union meetings

- 2A-3.2 Which one of the following topics is *not* addressed in the rules and regulations of the amateur service?
- A. Station operation standards
  - B. Technical standards
  - C. Providing emergency communications
  - D. Station construction standards

- Pg # indicates page # of my notes where subject is discussed
- # indicates no review of material
- Q # indicates # on test



2A-4.1 What is the definition of an *amateur operator*?  
 A. A person who has not received any training in radio operations  
 B. A person holding a written authorization to be the control operator of an amateur station  
 C. A person who performs private radio communications for hire  
 D. A trainee in a commercial radio station

Pg 13

2A-4.2 What term describes a person holding a written authorization to be the control operator of an amateur station?  
 A. A Citizen Radio operator  
 B. A Personal Radio operator  
 C. A Radio Service operator  
 D. An amateur operator

Pg 13

One question must be from the following:

2A-5.1 What is the portion of an amateur operator/primary station license that conveys operator privileges?  
 A. The verification section  
 B. Form 610  
 C. The operator license  
 D. The station license

Pg 13

2A-5.2 What authority is derived from an operator/primary station license?  
 A. The authority to operate any shortwave radio station  
 B. The authority to be the control operator of an amateur station  
 C. The authority to have an amateur station at a particular location  
 D. The authority to transmit on either amateur or Class D citizen's band frequencies

Pg 13

2A-6.1 What authority is derived from a written authorization for an amateur station?  
 A. The authority to use specified operating frequencies  
 B. The authority to operate an amateur station  
 C. The authority to enforce FCC Rules when violations are noted on the part of other operators  
 D. The authority to transmit on either amateur or Class D citizen's band frequencies

Pg 13

2A-6.2 What part of your amateur license gives you authority to have an amateur station?  
 A. The operator license  
 B. The FCC Form 610  
 C. The station license  
 D. An amateur operator/primary station license does not specify a station location

Pg 13

2A-7.1 What is an *amateur station*?  
 A. A licensed radio station engaged in broadcasting to the public in a limited and well-defined area  
 B. A radio station used to further commercial radio interests  
 C. A private radio service used for personal gain and public service  
 D. A station in an amateur service consisting of the apparatus necessary for carrying on radio communications

2A-7.1

2A-8.1 Who is a *control operator*?  
 A. An amateur operator designated by the licensee of a station to be responsible for the transmissions from that station to assure compliance with the FCC rules  
 B. A person, either licensed or not, who controls the emissions of an amateur station  
 C. An unlicensed person who is speaking over an amateur station's microphone while a licensed person is present  
 D. A government official who comes to an amateur station to take control for test purposes

Pg 13

2A-8.2 If you designate another amateur operator to be responsible for the transmissions from your station, what is the other operator called?  
 A. Auxiliary operator  
 B. Operations coordinator  
 C. Third party  
 D. Control operator

Pg 13

2A-9.1 List the five United States amateur operator/primary station license classes in order of increasing privileges.  
 A. Novice, General, Technician, Advanced, Amateur Extra  
 B. Novice, Technician, General, Advanced, Digital  
 C. Novice, Technician, General, Amateur, Extra  
 D. Novice, Technician, General, Advanced, Amateur Extra

Pg 18

2A-9.2 This question has been withdrawn.

2A-9.3 What is the license class immediately above Novice class?  
 A. The Digital class license  
 B. The Technician class license  
 C. The General class license  
 D. The Experimenter's class license

Pg 10 Q8

One question must be from the following:

2A-10.1 This question has been withdrawn

2A-10.2 What frequencies are available in the amateur 40-meter wavelength band for a control operator holding a Novice class operator license in ITU Region 2?  
 A. 3500 to 4000 kHz  
 B. 3700 to 3750 kHz  
 C. 7100 to 7150 kHz  
 D. 7000 to 7300 kHz

2A-10.2

2A-10.3 What frequencies are available in the amateur 15-meter wavelength band for a control operator holding a Novice class operator license?  
 A. 21.100 to 21.200 MHz  
 B. 21.000 to 21.450 MHz  
 C. 28.000 to 29.700 MHz  
 D. 28.100 to 28.200 MHz

Pg 11

2A-10.4 What frequencies are available in the amateur 10-meter wavelength band for a control operator holding a Novice class operator license?  
 A. 28.000 to 29.700 MHz  
 B. 28.100 to 28.300 MHz  
 C. 28.100 to 28.500 MHz  
 D. 28.300 to 28.500 MHz

Pg 11

2A-10.5 What frequencies are available in the amateur 220-MHz band for a control operator holding a Novice class operator license in ITU Region 2?  
A. 225.0 to 230.5 MHz  
B. 222.1 to 223.91 MHz  
C. 224.1 to 225.1 MHz  
D. 222.2 to 224.0 MHz

pg 11

2A-10.6 What frequencies are available in the amateur 1270-MHz band for a control operator holding a Novice class operator license?  
A. 1260 to 1270 MHz  
B. 1240 to 1300 MHz  
C. 1270 to 1295 MHz  
D. 1240 to 1246 MHz

2A-10.7 If you are operating your amateur station on 3725 kHz, in what meter band are you operating?  
A. 80 meters  
B. 40 meters  
C. 15 meters  
D. 10 meters

2A-10.8 If you are operating your amateur station on 7125 kHz, in what meter band are you operating?  
A. 80 meters  
B. 40 meters  
C. 15 meters  
D. 10 meters

2A-10.9 If you are operating your amateur station on 21150 kHz, in what meter band are you operating?  
A. 80 meters  
B. 40 meters  
C. 15 meters  
D. 10 meters

2A-10.10 If you are operating your amateur station on 28150 kHz, in what meter band are you operating?  
A. 80 meters  
B. 40 meters  
C. 15 meters  
D. 10 meters

One question must be from the following:

2A-11.1 Who is eligible to obtain a US amateur operator/primary station license?  
A. Anyone except a representative of a foreign government  
B. Only a citizen of the United States  
C. Anyone  
D. Anyone except an employee of the United States Government

2A-11.2 Who is not eligible to obtain a US amateur operator/primary station license?  
A. Any citizen of a country other than the United States  
B. A representative of a foreign government  
C. No one  
D. An employee of the United States Government

2A-12.1 What FCC examination elements are required for a Novice class license?  
A. Elements 1(A) and 2(A)  
B. Elements 1(A) and 3(A)  
C. Elements 1(A) and 2  
D. Elements 2 and 4

2A-12.2 What is an FCC Element 1(A) examination intended to prove?  
A. The applicant's ability to send and receive texts in the international Morse code at not less than 5 words per minute  
B. The applicant's ability to send and receive texts in the international Morse code at not less than 13 words per minute  
C. The applicant's knowledge of Novice class theory and regulations  
D. The applicant's ability to recognize Novice frequency assignments and operating modes

2A-12.3 What is an FCC Element 2 examination?  
A. A test of the applicant's ability to send and receive Morse code at 5 words per minute  
B. The written examination concerning the privileges of a Technician class operator license  
C. A test of the applicant's ability to recognize Novice frequency assignments  
D. The written examination concerning the privileges of a Novice class operator license

2A-13.1 Who is eligible to obtain an FCC-issued written authorization for an amateur station?  
A. A licensed amateur operator  
B. Any unlicensed person, except an agent of a foreign government  
C. Any unlicensed person, except an employee of the United States Government  
D. Any unlicensed United States Citizen

2A-14.1 Why is an amateur operator required to furnish the FCC with a current mailing address served by the US Postal service?  
A. So the FCC has a record of the location of each amateur station  
B. In order to comply with the Commission's rules and so the FCC can correspond with the licensee  
C. So the FCC can send license-renewal notices  
D. So the FCC can compile a list for use in a call sign directory

2A-15.1 Which one of the following call signs is a valid US amateur call?  
A. UA4HAK  
B. KBL7766  
C. KA9OLS  
D. BY7HY

2A-15.2 Which one of the following call signs is a valid US amateur call?  
A. CE2FTF  
B. G3GVA  
C. UA1ZAM  
D. AA2Z

2A-15.3 Which one of the following call signs is not a valid US amateur call?  
A. KDV5653  
B. WA1DVU  
C. KA5BUG  
D. NT0Z

2A-15.4 What letters may be used for the first letter in a valid US amateur call sign?  
A. K, N, U and W  
B. A, K, N and W  
C. A, B, C and D  
D. A, N, V and W

6

8-24-91

2A-15.5 Excluding special-event call signs that may be issued by the FCC, what numbers may be used in a valid US call sign?  
A. Any double-digit number, 10 through 99  
B. Any double-digit number, 22 through 45  
C. Any single digit, 1 through 9  
D. A single digit, 0 through 9

2A-16.1 Your Novice license was issued on November 1, 1988. When will it expire?  
A. On the date specified on the license  
B. November 30, 1998  
C. November 1, 1993  
D. November 1, 1990

One question must be from the following:

2A-17.1 What does the term *emission* mean?  
A. RF signals transmitted from a radio station  
B. Signals refracted by the E layer  
C. Filter out the carrier of a received signal  
D. Baud rate

2A-17.2 What emission types are Novice control operators permitted to use on the 80-meter wavelength band?  
A. CW only  
B. Data only  
C. RTTY only  
D. Phone only

2A-17.3 What emission types are Novice control operators permitted to use in the 40-meter wavelength band?  
A. CW only  
B. Data only  
C. RTTY only  
D. Phone only

2A-17.4 What emission types are Novice control operators permitted to use in the 15-meter wavelength band?  
A. CW only  
B. Data only  
C. RTTY only  
D. Phone only

2A-17.5 This question has been withdrawn. - *Used in test.*  
*Used to be: What emission types are Novice control operators permitted to use from 3625-3725 kHz*

2A-17.6 What emission types are Novice control operators permitted to use from 7100 to 7150 kHz in ITU Region 2?  
A. CW and data  
B. Phone  
C. All amateur emission privileges authorized for use on those frequencies  
D. CW only

2A-17.7 What emission types are Novice control operators permitted to use on frequencies from 21.1 to 21.2 MHz?  
A. CW and data only  
B. CW and phone only  
C. All amateur emission privileges authorized for use on those frequencies  
D. CW only

2A-17.8 What emission types are Novice control operators permitted to use on frequencies from 28.1 to 28.3 MHz?  
A. All authorized amateur emission privileges  
B. Data or phone only  
C. CW, RTTY and data  
D. CW and phone only

2A-17.9 What emission types are Novice control operators permitted to use on frequencies from 28.3 to 28.5 MHz?  
A. All authorized amateur emission privileges  
B. CW and data only  
C. CW and single-sideband phone only  
D. Data and phone only

2A-17.10 What emission types are Novice control operators permitted to use on the amateur 220-MHz band in ITU Region 2?  
A. CW and phone only  
B. CW and data only  
C. Data and phone only  
D. All amateur emission privileges authorized for use on 220 MHz

2A-17.11 What emission types are Novice control operators permitted to use on the amateur 1270-MHz band?  
A. Data and phone only  
B. CW and data only  
C. CW and phone only  
D. All amateur emission privileges authorized for use on 1270 MHz

2A-17.12 On what frequencies in the 10-meter wavelength band may a Novice control operator use single-sideband phone?  
A. 3700 to 3750 kHz  
B. 7100 to 7150 kHz  
C. 21100 to 21200 kHz  
D. 28300 to 28500 kHz

2A-17.13 On what frequencies in the 1.25-meter wavelength band in ITU Region 2 may a Novice control operator use FM phone emission?  
A. 28.3 to 28.5 MHz  
B. 144.0 to 148.0 MHz  
C. 222.1 to 223.91 MHz  
D. 1240 to 1270 MHz

One question must be from the following:

2A-18.1 What amount of output transmitting power may a Novice class control operator use when operating below 30 MHz?  
A. 200 watts input  
B. 250 watts output  
C. 1500 watts PEP output  
D. The minimum legal power necessary to carry out the desired communications

2A-18.2 What is the maximum transmitting power ever permitted to be used by an amateur station transmitting in the 80, 40 and 15-meter Novice bands?  
A. 75 watts PEP output  
B. 100 watts PEP output  
C. 200 watts PEP output  
D. 1500 watts PEP output

2A-18.3 What is the maximum transmitting power permitted an amateur station transmitting on 3725 kHz?  
A. 75 watts PEP output  
B. 100 watts PEP output  
C. 200 watts PEP output  
D. 1500 watts PEP output

10

2A-18.4 What is the maximum transmitting power permitted an amateur station transmitting on 7125 kHz?  
A. 75 watts PEP output  
B. 100 watts PEP output  
C. 200 watts PEP output  
D. 1500 watts PEP output

2A-18.5 What is the maximum transmitting power permitted an amateur station transmitting on 21.125 MHz?  
A. 75 watts PEP output  
B. 100 watts PEP output  
C. 200 watts PEP output  
D. 1500 watts PEP output

2A-19.1 What is the maximum transmitting power permitted an amateur station with a Novice control operator transmitting on 28.125 MHz?  
A. 75 watts PEP output  
B. 100 watts PEP output  
C. 200 watts PEP output  
D. 1500 watts PEP output

2A-19.2 What is the maximum transmitting power permitted an amateur station with a Novice control operator transmitting in the amateur 10-meter wavelength band?  
A. 25 watts PEP output  
B. 200 watts PEP output  
C. 1000 watts PEP output  
D. 1500 watts PEP output

2A-19.3 What is the maximum transmitting power permitted an amateur station with a Novice control operator transmitting in the amateur 220-MHz band?  
A. 5 watts PEP output  
B. 10 watts PEP output  
C. 25 watts PEP output  
D. 200 watts PEP output

2A-19.4 What is the maximum transmitting power permitted an amateur station with a Novice control operator transmitting in the amateur 1270-MHz band?  
A. 5 milliwatts PEP output  
B. 500 milliwatts PEP output  
C. 1 watt PEP output  
D. 5 watts PEP output

2A-19.5 What amount of transmitting power may an amateur station with a Novice control operator use in the amateur 220-MHz band?  
A. Not less than 5 watts PEP output  
B. The minimum legal power necessary to maintain reliable communications  
C. Not more than 50 watts PEP output  
D. Not more than 200 watts PEP output

2A-20.1 What term is used to describe narrow-band direct-printing telegraphy emissions?  
A. Teleport communications  
B. Direct communications  
C. RTTY communications  
D. Third-party communications

2A-20.2 What term is used to describe telemetry, telecommand and computer communications emissions?  
A. Teleport communications  
B. Direct communications  
C. Data communications  
D. Third-party communications

2A-20.3 On what frequencies in the 10-meter wavelength band are Novice control operators permitted to transmit RTTY?  
A. 28.1 to 28.5 MHz  
B. 28.0 to 29.7 MHz  
C. 28.1 to 28.2 MHz  
D. 28.1 to 28.3 MHz

One question must be from the following:

2A-21.1 Who is held responsible for the proper operation of an amateur station?  
A. Only the control operator  
B. Only the station licensee  
C. Both the control operator and the station licensee  
D. The person who owns the property where the station is located

2A-21.2 You allow another amateur operator to use your amateur station. What are your responsibilities, as the station licensee?  
A. You and the other amateur operator are equally responsible for the proper operation of your station  
B. Only the control operator is responsible for the proper operation of the station  
C. As the station licensee, you must be at the control point of your station whenever it is operated  
D. You must notify the FCC when another amateur will be the control operator of your station

2A-21.3 What is your primary responsibility as the station licensee?  
A. You must permit any licensed amateur radio operator to operate your station at any time upon request  
B. You must be present whenever the station is operated  
C. You must notify the FCC in writing whenever another amateur radio operator will act as the control operator  
D. You are responsible for the proper operation of the station for which you are licensed

2A-21.4 If you are the licensee of an amateur station when are you *not* responsible for its proper operation?  
A. Only when another licensed amateur is the control operator  
B. The licensee is responsible for the proper operation of the station for which he or she is licensed  
C. Only after notifying the FCC in writing that another licensed amateur will assume responsibility for the proper operation of your station  
D. Only when your station is in repeater operation

2A-22.1 When must an amateur station have a control operator?  
A. A control operator is only required for training purposes  
B. Whenever the station receiver is operated  
C. Whenever the station is transmitting  
D. A control operator is not required

Pg 9

Pg 9

Pg 9

Pg 5 & 17

Pg 5 & 13

10

2A-22.2 Another amateur gives you permission to use her amateur station. What are your responsibilities, as the control operator?

Pg 9 Q6

- A. Both you and she are equally responsible for the proper operation of her station
- B. Only the station licensee is responsible for the proper operation of the station, not you the control operator
- C. You must be certain the station licensee has given proper FCC notice that you will be the control operator
- D. You must inspect all antennas and related equipment to ensure they are working properly

2A-23.1 Who may be the control operator of an amateur station?

Pg 9 Q13

- A. Any person over 21 years of age
- B. Any properly licensed amateur operator that is designated by the station licensee
- C. Any licensed amateur operator with an Advanced class license or higher
- D. Any person over 21 years of age with a General class license or higher

2A-24.1 Where must an amateur operator be when he or she is performing the duties of control operator?

Pg 5

- A. Anywhere in the same building as the transmitter
- B. At the control point of the amateur station
- C. At the station entrance, to control entry to the room
- D. Within sight of the station monitor, to view the output spectrum of the transmitter

2A-25.1 Where must you keep your amateur operator license when you are operating a station?

- A. Your original operator license must always be posted in plain view
- B. Your original operator license must always be taped to the inside front cover of your station log
- C. You must have the original or a photocopy of your operator license in your possession
- D. You must have the original or a photocopy of your operator license posted at your primary station location. You need not have the original license nor a copy in your possession to operate another station

2A-26.1 Where must you keep your written authorization for an amateur station?

- A. Your original station license must always be taped to the inside front cover of your station log
- B. Your original station license must always be posted in plain view
- C. You must post the original or a photocopy of your station license at the main entrance to the transmitter building
- D. The original or a photocopy of the written authorization for an amateur station must be retained at the station

One question must be from the following:

2A-27.1 How often must an amateur station be identified?

Pg 10

- A. At the beginning of the contact and at least every ten minutes during a contact
- B. At least once during each transmission
- C. At least every ten minutes during a contact and at the end of the contact
- D. Every 15 minutes during a contact and at the end of the contact

2A-27.2 As an amateur operator, how should you correctly identify your station?

2A-27.2

- A. With the name and location of the control operator
- B. With the station call sign
- C. With the call of the control operator, even when he or she is visiting another radio amateur's station
- D. With the name and location of the station licensee, followed by the two-letter designation of the nearest FCC Field Office

2A-27.3 What station identification, if any, is required at the beginning of communication?

Pg 10

- A. The operator originating the contact must transmit both call signs
- B. No identification is required at the beginning of the contact
- C. Both operators must transmit their own call signs
- D. Both operators must transmit both call signs

2A-27.4 What station identification, if any, is required at the end of a communication?

Pg 10

- A. Both stations must transmit their own call sign, assuming they are FCC-licensed
- B. No identification is required at the end of the contact
- C. The station originating the contact must always transmit both call signs
- D. Both stations must transmit their own call sign followed by a two-letter designator for the nearest FCC field office

2A-27.5 What do the FCC rules for amateur station identification generally require?

Pg 10

- A. Each amateur station shall give its call sign at the beginning of each communication, and every ten minutes or less during a communication
- B. Each amateur station shall give its call sign at the end of each communication, and every ten minutes or less during a communication
- C. Each amateur station shall give its call sign at the beginning of each communication, and every five minutes or less during a communication
- D. Each amateur station shall give its call sign at the end of each communication, and every five minutes or less during a communication

2A-27.6 What is the fewest number of times you must transmit your amateur station identification during a 25 minute QSO?

Pg 10

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

2A-27.7 What is the longest period of time during a QSO that an amateur station does not need to transmit its station identification?

Pg 10

- A. 5 minutes
- B. 10 minutes
- C. 15 minutes
- D. 20 minutes

2A-28.1 With which amateur stations may an FCC-licensed amateur station communicate?

Pg 10

- A. All amateur stations
- B. All public noncommercial radio stations unless prohibited by the station's government
- C. Only with US amateur stations
- D. All amateur stations, unless prohibited by the amateur's government

3

2A-28.2

- With which non-amateur radio stations may an FCC-licensed amateur station communicate?
  - A. No non-amateur stations
  - B. All such stations
  - C. Only those authorized by the FCC
  - D. Only those who use the International Morse code

2A-29.1

- When must the licensee of an amateur station in portable or mobile operation notify the FCC?
  - A. One week in advance if the operation will last for more than 24 hours
  - B. FCC notification is not required for portable or mobile operation
  - C. One week in advance if the operation will last for more than a week
  - D. One month in advance of any portable or mobile operation

2A-29.2

- When may you operate your amateur station at a location within the United States, its territories or possessions other than the one listed on your station license?
  - A. Only during times of emergency
  - B. Only after giving proper notice to the FCC
  - C. During an emergency or an FCC-approved emergency preparedness drill
  - D. Whenever you want to

2A-30.1

- When are communications pertaining to the business or commercial affairs of any party permitted in the amateur service?
  - A. Only when the immediate safety of human life or immediate protection of property is threatened
  - B. There are no rules against conducting business communications in the amateur service
  - C. No business communications of any kind are ever permitted in the amateur service
  - D. Business communications are permitted between the hours of 9 AM to 5 PM, only on weekdays

pg 10 Q10

2A-30.2

- You wish to obtain an application for membership in the American Radio Relay League. When would you be permitted to send an amateur radio message requesting the application?
  - A. At any time, since the ARRL is a not-for-profit organization
  - B. Never. This would facilitate the commercial affairs of the ARRL
  - C. Only during normal business hours, between 9 AM and 5 PM
  - D. At any time, since there are no rules against conducting business communications in the amateur service

2A-30.3

- On your way home from work you decide to order pizza for dinner. When would you be permitted to use the autopatch on your radio club repeater to order the pizza?
  - A. At any time, since you will not profit from the communications
  - B. Only during normal business hours, between 9 AM and 5 PM
  - C. At any time, since there are no rules against conducting business communications in the amateur service
  - D. Never. This would facilitate the commercial affairs of a business

One question must be from the following:

2A-31.1

- When may an FCC-licensed amateur operator communicate with an amateur operator in a foreign country?
  - A. Only when the foreign operator uses English as his primary language
  - B. All the time, except on 28.600 to 29.700 MHz
  - C. Only when a third party agreement exists between the US and the foreign country
  - D. At any time unless prohibited by either the US or the foreign government

2A-32.1

- When may an amateur station be used to transmit messages for hire?
  - A. Under no circumstances may an amateur station be hired to transmit messages
  - B. Modest payment from a non-profit charitable organization is permissible
  - C. No money may change hands, but a radio amateur may be compensated for services rendered with gifts of equipment or services rendered as a returned favor
  - D. All payments received in return for transmitting messages by amateur radio must be reported to the IRS

2A-32.2

- When may the control operator be paid to transmit messages from an amateur station?
  - A. The control operator may be paid if he or she works for a public service agency such as the Red Cross
  - B. The control operator may not be paid under any circumstances
  - C. The control operator may be paid if he or she reports all income earned from operating an amateur station to the IRS as receipt of tax-deductible contributions
  - D. The control operator may accept compensation if he or she works for a club station during the period in which the station is transmitting telegraphy practice or information bulletins if certain exacting conditions are met

2A-33.1

- When is an amateur operator permitted to broadcast information intended for the general public?
  - A. Amateur operators are not permitted to broadcast information intended for the general public
  - B. Only when the operator is being paid to transmit the information
  - C. Only when such transmissions last less than 1 hour in any 24-hour period
  - D. Only when such transmissions last longer than 15 minutes

2A-34.1

- What is *third-party communications*?
  - A. A message passed from the control operator of an amateur station to another control operator on behalf of another person
  - B. Public service communications handled on behalf of a minor political party
  - C. Only messages that are formally handled through amateur radio channels
  - D. A report of highway conditions transmitted over a local repeater

pg 10

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- 2A-34.2 Who is a *third party* in amateur communications?
- A. The amateur station that breaks into a two-way contact between two other amateur stations
  - B. Any person for whom a message is passed through amateur communication channels other than the control operators of the two stations handling the message
  - C. A shortwave listener monitoring a two-way amateur communication
  - D. The control operator present when an unlicensed person communicates over an amateur station

pg 10

- 2A-34.3 When is an amateur operator permitted to transmit a message to a foreign country for a third party?
- A. Anytime
  - B. Never
  - C. Anytime, unless there is a third-party communications agreement between the US and the foreign government
  - D. When there is a third-party communications agreement between the US and the foreign government, or when the third party is eligible to be the control operator of the station

pg 10  
Q 7

- 2A-35.1 Is an amateur station permitted to transmit music?
- A. The transmission of music is not permitted in the amateur service
  - B. When the music played produces no dissonances or spurious emissions
  - C. When it is used to jam an illegal transmission
  - D. Only above 1280 MHz

- 2A-36.1 Is the use of codes or ciphers where the intent is to obscure the meaning permitted during a two-way communication in the amateur service?
- A. Codes and ciphers are permitted during ARRL-sponsored contests
  - B. Codes and ciphers are permitted during nationally declared emergencies
  - C. The transmission of codes and ciphers where the intent is to obscure the meaning is not permitted in the amateur service
  - D. Codes and ciphers are permitted above 1280 MHz

- 2A-36.2 When is an operator in the amateur service permitted to use abbreviations that are intended to obscure the meaning of the message?
- A. Only during ARRL-sponsored contests
  - B. Only on frequencies above 222.5 MHz
  - C. Only during a declared communications emergency
  - D. Abbreviations that are intended to obscure the meaning of the message may never be used in the amateur service

One question must be from the following:

- 2A-37.1 Under what circumstances, if any, may the control operator cause *false or deceptive signals or communications* to be transmitted?
- A. Under no circumstances
  - B. When operating a beacon transmitter in a "fox hunt" exercise
  - C. When playing a harmless "practical joke" without causing interference to other stations that are not involved
  - D. When you need to obscure the meaning of transmitted information to ensure secrecy

✓

✓ = common level

- 2A-37.2 If an amateur operator transmits the word "MAYDAY" when no actual emergency has occurred, what is this called?
- A. A traditional greeting in May
  - B. An Emergency Action System test transmission
  - C. False or deceptive signals
  - D. "MAYDAY" has no significance in an emergency situation

- 2A-38.1 When may an amateur station transmit unidentified communications?
- A. A transmission need not be identified if it is restricted to brief tests not intended for reception by other parties
  - B. A transmission need not be identified when conducted on a clear frequency or "dead band" where interference will not occur
  - C. An amateur operator may never transmit unidentified communications
  - D. A transmission need not be identified unless two-way communications or third-party communications handling are involved

pg 13

- 2A-38.2 What is the meaning of the term *unidentified radio communications or signals*?
- A. Radio communications in which the transmitting station's call sign is transmitted in modes other than CW and voice
  - B. Radio communications approaching a receiving station from an unknown direction
  - C. Radio communications in which the operator fails to transmit his or her name and QTH
  - D. Radio communications in which the station identification is not transmitted

- 2A-38.3 What is the term used to describe a transmission from an amateur station that does not transmit the required station identification?
- A. Unidentified communications or signals
  - B. Reluctance modulation
  - C. NØN emission
  - D. Tactical communication

- 2A-39.1 When may an amateur operator willfully or maliciously interfere with a radio communication or signal?
- A. You may jam another person's transmissions if that person is not operating in a legal manner
  - B. You may interfere with another station's signals if that station begins transmitting on a frequency already occupied by your station
  - C. You may never willfully or maliciously interfere with another station's transmissions
  - D. You may expect, and cause, deliberate interference because it is unavoidable during crowded band conditions

✓

- 2A-39.2 What is the meaning of the term *malicious interference*?
- A. Accidental interference
  - B. Intentional interference
  - C. Mild interference
  - D. Occasional interference

✓

- 2A-39.3 What is the term used to describe an amateur radio transmission that is intended to disrupt other communications in progress?
- A. Interrupted CW
  - B. Malicious interference
  - C. Transponded signals
  - D. Unidentified transmissions

✓

⑤

2A-40.1

As an amateur operator, you receive an *Official Notice of Violation* from the FCC. How promptly must you respond?

- A. Within 90 days
- B. Within 30 days
- C. As specified in the Notice
- D. The next day

2A-40.2

If you were to receive a voice distress signal from a station on a frequency outside your operator privileges, what restrictions would apply to assisting the station in distress?

- A. You would not be allowed to assist the station because the frequency of its signals were outside your operator privileges
- B. You would be allowed to assist the station only if your signals were restricted to the nearest frequency band of your privileges
- C. You would be allowed to assist the station on a frequency outside of your operator privileges only if you used international Morse code
- D. You would be allowed to assist the station on a frequency outside of your operator privileges using any means of radio communications at your disposal

2A-40.3

If you were in a situation where normal communication systems were disrupted due to a disaster, what restrictions would apply to essential communications you might provide in connection with the immediate safety of human life?

- A. You would not be allowed to communicate at all except to the FCC Engineer in Charge of the area concerned
- B. You would be restricted to communications using only the emissions and frequencies authorized to your operator privileges
- C. You would be allowed to communicate on frequencies outside your operator privileges only if you used international Morse code
- D. You would be allowed to use any means of radio communication at your disposal

### Subelement 2B—Operating Procedures (2 Questions)

One question must be from the following:

2B-1-1.1

What is the most important factor to consider when selecting a transmitting frequency within your authorized subband?

- A. The frequency should not be in use by other amateurs
- B. You should be able to hear other stations on the frequency to ensure that someone will be able to hear you
- C. Your antenna should be resonant at the selected frequency
- D. You should ensure that the SWR on the antenna feed line is high enough at the selected frequency

2B-1-1.2

You wish to contact an amateur station more than 1500 miles away on a summer afternoon. Which band is most likely to provide a successful contact?

- A. The 80- or 40-meter wavelength bands
- B. The 40- or 15-meter wavelength bands
- C. The 15- or 10-meter wavelength bands
- D. The 1¼ meter or 23-centimeter wavelength bands

2B-1-1.3

How can on-the-air transmitter tune-up be kept as short as possible?

- A. By using a random wire antenna
- B. By tuning up on 40 meters first, then switching to the desired band
- C. By tuning the transmitter into a dummy load
- D. By using twin lead instead of coaxial-cable feed lines

2B-1-2.1

You are having a QSO with your uncle in Pittsburgh when you hear an emergency call for help on the frequency you are using. What should you do?

- A. Inform the station that the frequency is in use
- B. Direct the station to the nearest emergency net frequency
- C. Call your local Civil Preparedness Office and inform them of the emergency
- D. Immediately stand by to copy the emergency communication

2B-2-1.1

What is the format of a standard Morse code CQ call?

- A. Transmit the procedural signal "CQ" three times, followed by the procedural signal "DE", followed by your call three times
- B. Transmit the procedural signal "CQ" three times, followed by the procedural signal "DE", followed by your call one time
- C. Transmit the procedural signal "CQ" ten times, followed by the procedural signal "DE", followed by your call one time
- D. Transmit the procedural signal "CQ" continuously until someone answers your call

2B-2-1.2

How should you answer a Morse code CQ call?

- A. Send your call sign four times
- B. Send the other station's call sign twice, followed by the procedural signal "DE", followed by your call sign twice
- C. Send the other station's call sign once, followed by the procedural signal "DE", followed by your call sign four times
- D. Send your call sign followed by your name, station location and a signal report

2B-2-2.1 At what telegraphy speed should a "CQ" message be transmitted?  
A. Only speeds below five WPM  
B. The highest speed your keyer will operate  
C. Any speed at which you can reliably receive  
D. The highest speed at which you can control the keyer

2B-2-5.3 What does the T in the RST signal report mean?  
A. The tone of the signal  
B. The closeness of the signal to "telephone" quality  
C. The timing of the signal dot to dash ratio  
D. The tempo of the signal

2B-2-3.1 What is the meaning of the Morse code character AR?  
A. Only the called station transmit  
B. All received correctly  
C. End of transmission  
D. Best regards

2B-2-6.1 What is one meaning of the Q signal "QRS"?  
A. Interference from static  
B. Send more slowly  
C. Send RST report  
D. Radio station location is

2B-2-3.2 What is the meaning of the Morse code character SK?  
A. Received some correctly  
B. Best regards  
C. Wait  
D. End of contact

2B-2-6.2 What is one meaning of the Q signal "QRT"?  
A. The correct time is  
B. Send RST report  
C. Stop sending  
D. Send more slowly

2B-2-3.3 What is the meaning of the Morse code character BT?  
A. Double dash "="  
B. Fraction bar "/"  
C. End of contact  
D. Back to you

2B-2-6.3 What is one meaning of the Q signal "QTH"?  
A. Time here is  
B. My name is  
C. Stop sending  
D. My location is

2B-2-3.4 What is the meaning of the Morse code character DN?  
A. Double dash "="  
B. Fraction bar "/"  
C. Done now (end of contact)  
D. Called station only transmit

2B-2-6.4 What is one meaning of the Q signal "QRZ," when it is followed with a question mark?  
A. Who is calling me?  
B. What is your radio zone?  
C. What time zone are you in?  
D. Is this frequency in use?

2B-2-3.5 What is the meaning of the Morse code character KN?  
A. Fraction bar "/"  
B. End of contact  
C. Called station only transmit  
D. Key now (go ahead to transmit)

2B-2-6.5 What is one meaning of the Q signal "QSL," when it is followed with a question mark?  
A. Shall I send you my log?  
B. Can you acknowledge receipt (of my message)?  
C. Shall I send more slowly?  
D. Who is calling me?

2B-2-4.1 What is the procedural signal "CQ" used for?  
A. To notify another station that you will call on the quarter hour  
B. To indicate that you are testing a new antenna and are not listening for another station to answer  
C. To indicate that only the called station should transmit  
D. A general call when you are trying to make a contact

2B-3-1.1 What is the format of a standard radiotelephone CQ call?  
A. Transmit the phrase "CQ" at least ten times, followed by "this is," followed by your call sign at least two times  
B. Transmit the phrase "CQ" at least five times, followed by "this is," followed by your call sign once  
C. Transmit the phrase "CQ" three times, followed by "this is," followed by your call sign three times  
D. Transmit the phrase "CQ" at least ten times, followed by "this is," followed by your call sign once

2B-2-4.2 What is the procedural signal "DE" used for?  
A. To mean "from" or "this is," as in "W9NGT de N9BTT"  
B. To indicate directional emissions from your antenna  
C. To indicate "received all correctly"  
D. To mean "calling any station"

2B-3-1.2 How should you answer a radiotelephone CQ call?  
A. Transmit the other station's call sign at least ten times, followed by "this is," followed by your call sign at least twice  
B. Transmit the other station's call sign at least five times phonetically, followed by "this is," followed by your call sign at least once  
C. Transmit the other station's call sign at least three times, followed by "this is," followed by your call sign at least five times phonetically  
D. Transmit the other station's call sign once, followed by "this is," followed by your call sign given phonetically

2B-2-4.3 What is the procedural signal "K" used for?  
A. To mean "any station transmit"  
B. To mean "all received correctly"  
C. To mean "end of message"  
D. To mean "called station only transmit"

2B-2-5.1 What does the R in the RST signal report mean?  
A. The recovery of the signal  
B. The resonance of the CW tone  
C. The rate of signal flutter  
D. The readability of the signal

2B-3-2.1 How is the call sign "KA3BGQ" stated in Standard International Phonetics?  
A. Kilo Alfa Three Bravo Golf Quebec  
B. King America Three Bravo Golf Quebec  
C. Kilowatt Alfa Three Bravo George Queen  
D. Kilo America Three Baker Golf Quebec

2B-2-5.2 What does the S in the RST signal report mean?  
A. The scintillation of a signal  
B. The strength of the signal  
C. The signal quality  
D. The speed of the CW transmission

17

- 2B-3-2.2 How is the call sign "WESTZD" stated phonetically?
- Whiskey Echo Foxtrot Tango Zulu Delta
  - Washington England Five Tokyo Zanzibar Denmark
  - Whiskey Echo Five Tango Zulu Delta
  - Whiskey Easy Five Tear Zebra Dog

- 2B-3-2.3 How is the call sign "KC4HRM" stated phonetically?
- Kilo Charlie Four Hotel Romeo Mike
  - Kilowatt Charlie Four Hotel Roger Mexico
  - Kentucky Canada Four Honolulu Radio Mexico
  - King Charlie Foxtrot Hotel Roger Mary

- 2B-3-2.4 How is the call sign "AF6PSQ" stated phonetically?
- America Florida Six Portugal Spain Quebec
  - Adam Frank Six Peter Sugar Queen
  - Alfa Fox Sierra Papa Santiago Queen
  - Alfa Foxtrot Six Papa Sierra Quebec

- 2B-3-2.5 How is the call sign "NB8LXG" stated phonetically?
- November Bravo Eight Lima Xray Golf
  - Nancy Baker Eight Love Xray George
  - Norway Boston Eight London Xray Germany
  - November Bravo Eight London Xray Germany

- 2B-3-2.6 How is the call sign "KJ1UOI" stated phonetically?
- King John One Uncle Oboe Ida
  - Kilowatt George India Uncle Oscar India
  - Kilo Juliette One Uniform Oscar India
  - Kentucky Juliette One United Ontario Indiana

- 2B-3-2.7 How is the call sign "WV2BPZ" stated phonetically?
- Whiskey Victor Two Bravo Papa Zulu
  - Willie Victor Two Baker Papa Zebra
  - Whiskey Victor Tango Bravo Papa Zulu
  - Willie Virginia Two Boston Peter Zanzibar

- 2B-3-2.8 How is the call sign "NY3CTJ" stated phonetically?
- Norway Yokohama Three California Tokyo Japan
  - Nancy Yankee Three Cat Texas Jackrabbit
  - Norway Yesterday Three Charlie Texas Juliette
  - November Yankee Three Charlie Tango Juliette

- 2B-3-2.9 How is the call sign "KG7DRV" stated phonetically?
- Kilo Golf Seven Denver Radio Venezuela
  - Kilo Golf Seven Delta Romeo Victor
  - King John Seven Dog Radio Victor
  - Kilowatt George Seven Delta Romeo Video

- 2B-3-2.10 How is the call sign "WX9HKS" stated phonetically?
- Whiskey Xray Nine Hotel Kilo Sierra
  - Willie Xray November Hotel King Sierra
  - Washington Xray Nine Honolulu Kentucky Santiago
  - Whiskey Xray Nine Henry King Sugar

- 2B-3-2.11 How is the call sign "AE0LQY" stated phonetically?
- Able Easy Zero Lima Quebec Yankee
  - Arizona Equador Zero London Queen Yesterday
  - Alfa Echo Zero Lima Quebec Yankee
  - Able Easy Zero Love Queen Yoke

One question must be from the following:

- 2B-4-1.1 What is the format of a standard RTTY CQ call?
- Transmit the phrase "CQ" three times, followed by "DE", followed by your call sign two times
  - Transmit the phrase "CQ" three to six times, followed by "DE", followed by your call sign three times
  - Transmit the phrase "CQ" ten times, followed by the procedural signal "DE", followed by your call one time
  - Transmit the phrase "CQ" continuously until someone answers your call

- 2B-4-2.1 You receive an RTTY CQ call at 45 bauds. At what speed should you respond?
- 22½ bauds
  - 45 bauds
  - 90 bauds
  - Any speed, since radioteletype systems adjust to any signal rate

- 2B-5-1.1 What does the term *connected* mean in a packet-radio link?
- A telephone link has been established between two amateurs
  - An amateur radio message has reached the station for local delivery
  - The transmitting station is sending data specifically addressed to the receiving station, and the receiving station is acknowledging that the data has been received correctly
  - The transmitting station and a receiving station are using a certain digipeater, so no other contacts can take place until they are finished

- 2B-5-1.2 What does the term *monitoring* mean on a frequency used for packet radio?
- The FCC is copying all messages to determine their content
  - A member of the Amateur Auxiliary to the FCC's Field Operations Bureau is copying all messages to determine their content
  - The receiving station's video monitor is displaying all messages intended for that station, and is acknowledging correct receipt of the data
  - The receiving station is displaying information that may not be addressed to that station, and is not acknowledging correct receipt of the data

- 2B-5-2.1 What is a *digipeater*?
- A packet-radio station used to retransmit data that is specifically addressed to be retransmitted by that station
  - An amateur radio repeater designed to retransmit all audio signals in a digital form
  - An amateur radio repeater designed using only digital electronics components
  - A packet-radio station that retransmits any signals it receives

- 2B-5-2.2 What is the meaning of the term *network* in packet radio?
- A system of telephone lines interconnecting packet-radio stations to transfer data
  - A method of interconnecting packet-radio stations so that data can be transferred over long distances
  - The interlaced wiring on a terminal-node-controller board
  - The terminal-node-controller function that automatically rejects another caller when the station is connected

2B-6-1.1

What is a good way to establish contact on a repeater?

- A. Give the call sign of the station you want to contact three times
- B. Call the other operator by name and then give your call sign three times
- C. Call the desired station and then identify your own station
- D. Say, "Breaker, breaker," and then give your call sign

2B-6-2.1

What is the main purpose of a repeater?

- A. To provide a station that makes local information available 24 hours a day
- B. To provide a means of linking amateur radio stations with the telephone system
- C. To retransmit NOAA weather information during severe storm warnings
- D. Repeaters extend the operating range of portable and mobile stations

Pg 18

2B-6-3.1

What does it mean to say that a repeater has an input and an output frequency?

- A. The repeater receives on one frequency and transmits on another
- B. All repeaters offer a choice of operating frequency, in case one is busy
- C. One frequency is used to control repeater functions and the other frequency is the one used to retransmit received signals
- D. Repeaters require an access code to be transmitted on one frequency while your voice is transmitted on the other

Pg 6 + 18

2B-6-4.1

When should simplex operation be used instead of using a repeater?

- A. Whenever greater communications reliability is needed
- B. Whenever a contact is possible without using a repeater
- C. Whenever you need someone to make an emergency telephone call
- D. Whenever you are traveling and need some local information

2B-6-5.1

What is an autopatch?

- A. A repeater feature that automatically selects the strongest signal to be repeated
- B. An automatic system of connecting a mobile station to the next repeater as it moves out of range of the first
- C. A device that allows repeater users to make telephone calls from their portable or mobile stations
- D. A system that automatically locks other stations out of the repeater when there is a QSO in progress

2B-6-5.2

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

- A. It allows the repeater to have a rest period after heavy use
- B. It logs repeater transmit time to determine when the repeater mean time between failure rating is exceeded
- C. It limits repeater transmission time to no more than ten minutes
- D. It limits repeater transmission time to no more than three minutes

Subelement 2C—Radio-Wave Propagation (1 Question)

One question must be from the following:

2C-1.1

What type of radio-wave propagation occurs when the signal travels in a straight line from the transmitting antenna to the receiving antenna?

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

2C-1.2

What path do radio waves usually follow from a transmitting antenna to a receiving antenna at VHF and higher frequencies?

- A. A bent path through the ionosphere
- B. A straight line
- C. A great circle path over either the north or south pole
- D. A circular path going either east or west from the transmitter

2C-2.1

What type of propagation involves radio signals that travel along the surface of the Earth?

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

2C-2.2

What is the meaning of the term ground-wave propagation?

- A. Signals that travel along seismic fault lines
- B. Signals that travel along the surface of the earth
- C. Signals that are radiated from a ground-plane antenna
- D. Signals that are radiated from a ground station to a satellite

2C-2.3

Two amateur radio stations a few miles apart and separated by a low hill blocking their line-of-sight path are communicating on 3.725 MHz. What type of propagation is probably being used?

- A. Tropospheric ducting
- B. Ground wave
- C. Meteor scatter
- D. Sporadic E

2C-2.4

When compared to sky-wave propagation, what is the usual effective range of ground-wave propagation?

- A. Much smaller
- B. Much greater
- C. The same
- D. Dependent on the weather

2C-3.1

What type of propagation uses radio signals refracted back to earth by the ionosphere?

- A. Sky wave
- B. Earth-moon-earth
- C. Ground wave
- D. Tropospheric

2C-3.2

What is the meaning of the term sky-wave propagation?

- A. Signals reflected from the moon
- B. Signals refracted by the ionosphere
- C. Signals refracted by water-dense cloud formations
- D. Signals retransmitted by a repeater

2C-3.3

What does the term skip mean?

- A. Signals are reflected from the moon
- B. Signals are refracted by water-dense cloud formations
- C. Signals are retransmitted by repeaters
- D. Signals are refracted by the ionosphere

9

8-24-91

2C-3.4

- What is the area of weak signals between the ranges of ground waves and the first hop called?
- A. The skip zone
  - B. The hysteresis zone
  - C. The monitor zone
  - D. The transequatorial zone

2C-6.2

Why can the direction that a VHF or UHF radio signal is traveling be changed if there is a tall building in the way?

- A. You can never tell what direction a radio wave is traveling in
- B. These radio signals are easily bent by the ionosphere
- C. These radio signals are easily reflected by objects in their path
- D. These radio signals are sometimes scattered in the ectosphere

Sub

One

2D-1

2D-

2C-3.5

- What is the meaning of the term *skip zone*?
- A. An area covered by skip propagation
  - B. The area where a satellite comes close to the earth, and skips off the ionosphere
  - C. An area that is too far for ground-wave propagation, but too close for skip propagation
  - D. The area in the atmosphere that causes skip propagation

2C-3.6

What type of radio wave propagation makes it possible for amateur stations to communicate long distances?

- A. Direct-inductive propagation
- B. Knife-edge diffraction
- C. Ground-wave propagation
- D. Sky-wave propagation

2C-4.1

How long is an average *sunspot cycle*?

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

2C-4.2

What is the term used to describe the long-term variation in the number of visible sunspots?

- A. The 11-year cycle
- B. The Solar magnetic flux cycle
- C. The hysteresis count
- D. The sunspot cycle

2C-5.1

What effect does the number of sunspots have on the maximum usable frequency (MUF)?

- A. The more sunspots there are, the higher the MUF will be
- B. The more sunspots there are, the lower the MUF will be
- C. The MUF is equal to the square of the number of sunspots
- D. The number of sunspots effects the lowest usable frequency (LUF) but not the MUF

2C-5.2

What effect does the number of sunspots have on the ionization level in the atmosphere?

- A. The more sunspots there are, the lower the ionization level will be
- B. The more sunspots there are, the higher the ionization level will be
- C. The ionization level of the ionosphere is equal to the square root of the number of sunspots
- D. The ionization level of the ionosphere is equal to the square of the number of sunspots

2C-6.1

Why can a VHF or UHF radio signal that is transmitted toward a mountain often be received at some distant point in a different direction?

- A. You can never tell what direction a radio wave is traveling in
- B. These radio signals are easily bent by the ionosphere
- C. These radio signals are easily reflected by objects in their path
- D. These radio signals are sometimes scattered in the ectosphere

8

Subelement 2D—Amateur Radio Practice (4 Questions)

One question must be from the following:

- 2D-1.1 How can you prevent the use of your amateur station by unauthorized persons?
  - A. Install a carrier-operated relay in the main power line
  - B. Install a key-operated "ON/OFF" switch in the main power line
  - C. Post a "Danger - High Voltage" sign in the station
  - D. Install AC line fuses in the main power line

pg 10

- 2D-1.2 What is the purpose of a key-operated "ON/OFF" switch in the main power line?
  - A. To prevent the use of your station by unauthorized persons
  - B. To provide an easy method for the FCC to put your station off the air
  - C. To prevent the power company from inadvertently turning off your electricity during an emergency
  - D. As a safety feature, to kill all power to the station in the event of an emergency

pg 10

- 2D-2.1 Why should all antenna and rotator cables be grounded when an amateur station is not in use?
  - A. To lock the antenna system in one position
  - B. To avoid radio frequency interference
  - C. To save electricity
  - D. To protect the station and building from damage due to a nearby lightning strike

pg 14 pg 16

- 2D-2.2 How can an antenna system be protected from damage caused by a nearby lightning strike?
  - A. Install a balun at the antenna feed point
  - B. Install an RF choke in the feed line
  - C. Ground all antennas when they are not in use
  - D. Install a line fuse in the antenna wire

pg 16

- 2D-2.3 How can amateur station equipment be protected from damage caused by voltage induced in the power lines by a nearby lightning strike?
  - A. Use heavy insulation on the wiring
  - B. Keep the equipment on constantly
  - C. Disconnect the ground system
  - D. Disconnect all equipment after use, either by unplugging or by using a main disconnect switch

pg 16

- 2D-2.4 For proper protection from lightning strikes, what equipment should be grounded in an amateur station?
  - A. The power supply primary
  - B. All station equipment
  - C. The feed line center conductors
  - D. The AC power mains

pg 16

- 2D-3.1 What is a convenient indoor grounding point for an amateur station?
  - A. A metallic cold water pipe
  - B. PVC plumbing
  - C. A window screen
  - D. A natural gas pipe

pg 16

- 2D-3.2 To protect against electrical shock hazards, what should you connect the chassis of each piece of your equipment to?
  - A. Insulated shock mounts
  - B. The antenna
  - C. A good ground connection
  - D. A circuit breaker

pg 16

2D-3.3

- What type of material should a driven ground rod be made of?
  - A. Ceramic or other good insulator
  - B. Copper or copper-clad steel
  - C. Iron or steel
  - D. Fiberglass

2D-3.4

- What is the shortest ground rod you should consider installing for your amateur station RF ground?
  - A. 4 foot
  - B. 6 foot
  - C. 8 foot
  - D. 10 foot

One question must be from the following:

2D-4.1

- What precautions should you take when working with 1270-MHz waveguide?
  - A. Make sure that the RF leakage filters are installed at both ends of the waveguide
  - B. Never look into the open end of a waveguide when RF is applied
  - C. Minimize the standing wave ratio before you test the waveguide
  - D. Never have both ends of the waveguide open at the same time when RF is applied

2D-4.2

- What precautions should you take when you mount a UHF antenna in a permanent location?
  - A. Make sure that no one can be near the antenna when you are transmitting
  - B. Make sure that the RF field screens are in place
  - C. Make sure that the antenna is near the ground to maximize directional effect
  - D. Make sure you connect an RF leakage filter at the antenna feed point

pg 11

2D-4.3

- What precautions should you take before removing the shielding on a UHF power amplifier?
  - A. Make sure all RF screens are in place at the antenna
  - B. Make sure the feed line is properly grounded
  - C. Make sure the amplifier cannot be accidentally energized
  - D. Make sure that the RF leakage filters are connected

pg 11 pg 16

2D-4.4

- Why should you use only good-quality, well-constructed coaxial cable and connectors for a UHF antenna system?
  - A. To minimize RF leakage
  - B. To reduce parasitic oscillations
  - C. To maximize the directional characteristics of your antenna
  - D. To maximize the standing wave ratio of the antenna system

2D-4.5

- Why should you be careful to position the antenna of your 220-MHz hand-held transceiver away from your head when you are transmitting?
  - A. To take advantage of the directional effect
  - B. To minimize RF exposure
  - C. To use your body to reflect the signal, improving the directional characteristics of the antenna
  - D. To minimize static discharges

pg 11

6

2D-4.6

Which of the following types of radiation produce health risks most like the risks produced by radio frequency radiation?

- A. Microwave oven radiation and ultraviolet radiation
- B. Microwave oven radiation and radiation from an electric space heater
- C. Radiation from Uranium or Radium and ultraviolet radiation
- D. Sunlight and radiation from an electric space heater

2D-5.1

Why is there a switch that turns off the power to a high-voltage power supply if the cabinet is opened?

- A. To prevent RF from escaping from the supply
- B. To prevent RF from entering the supply through the open cabinet
- C. To provide a way to turn the power supply on and off
- D. To reduce the danger of electrical shock

2D-5.2

What purpose does a safety interlock on an amateur transmitter serve?

- A. It reduces the danger that the operator will come in contact with dangerous high voltages when the cabinet is opened while the power is on
- B. It prevents the transmitter from being turned on accidentally
- C. It prevents RF energy from leaking out of the transmitter cabinet
- D. It provides a way for the station licensee to ensure that only authorized operators can turn the transmitter on

2D-6.1

What type of safety equipment should you wear when you are working at the top of an antenna tower?

- A. A grounding chain
- B. A reflective vest
- C. Loose clothing
- D. A carefully inspected safety belt

2D-6.2

Why should you wear a safety belt when you are working at the top of an antenna tower?

- A. To provide a way to safely hold your tools so they don't fall and injure someone on the ground
- B. To maintain a balanced load on the tower while you are working
- C. To provide a way to safely bring tools up and down the tower
- D. To prevent an accidental fall

2D-6.3

For safety purposes, how high should you locate all portions of your horizontal wire antenna?

- A. High enough so that a person cannot touch them from the ground
- B. Higher than chest level
- C. Above knee level
- D. Above electrical lines

2D-6.4

What type of safety equipment should you wear when you are on the ground assisting someone who is working on an antenna tower?

- A. A reflective vest
- B. A safety belt
- C. A grounding chain
- D. A hard hat

2D-6.5

Why should you wear a hard hat when you are on the ground assisting someone who is working on an antenna tower?

- A. To avoid injury from tools dropped from the tower
- B. To provide an RF shield during antenna testing
- C. To avoid injury if the tower should accidentally collapse
- D. To avoid injury from walking into tower guy wires

One question must be from the following:

2D-7-1.1 What accessory is used to measure standing wave ratio?

Pg 1 + 11

- A. An ohm meter
- B. An ammeter
- C. An SWR meter
- D. A current bridge

2D-7-1.2 What instrument is used to indicate the relative impedance match between a transmitter and antenna?

Pg 7 917

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

2D-7-2.1 What does an SWR-meter reading of 1:1 indicate?

- A. An antenna designed for use on another frequency band is probably connected
- B. An optimum impedance match has been attained
- C. No power is being transferred to the antenna
- D. An SWR meter never indicates 1:1 unless it is defective

2D-7-2.2 What does an SWR-meter reading of less than 1.5:1 indicate?

- A. An unacceptably low reading
- B. An unacceptably high reading
- C. An acceptable impedance match
- D. An antenna gain of 1.5

2D-7-2.3 What does an SWR-meter reading of 4:1 indicate?

- A. An unacceptably low reading
- B. An acceptable impedance match
- C. An antenna gain of 4
- D. An impedance mismatch, which is not acceptable; it indicates problems with the antenna system

2D-7-2.4 What does an SWR-meter reading of 5:1 indicate?

- A. The antenna will make a 10-watt signal as strong as a 50-watt signal
- B. Maximum power is being delivered to the antenna
- C. An unacceptable mismatch is indicated
- D. A very desirable impedance match has been attained

2D-7-3.1 What kind of SWR-meter reading may indicate poor electrical contact between parts of an antenna system?

- A. An erratic reading
- B. An unusually low reading
- C. No reading at all
- D. A negative reading

13

- 2D-7-3.2 What does an unusually high SWR-meter reading indicate?
- A. That the antenna is not the correct length, or that there is an open or shorted connection somewhere in the feed line
  - B. That the signals arriving at the antenna are unusually strong, indicating good radio conditions
  - C. That the transmitter is producing more power than normal, probably indicating that the final amplifier tubes or transistors are about to go bad
  - D. That there is an unusually large amount of solar white-noise radiation, indicating very poor radio conditions

- 2D-7-3.3 The SWR-meter reading at the low-frequency end of an amateur band is 2.5:1, and the SWR-meter reading at the high-frequency end of the same band is 5:1. What does this indicate about your antenna?
- A. The antenna is broadbanded
  - B. The antenna is too long for operation on this band
  - C. The antenna is too short for operation on this band
  - D. The antenna has been optimized for operation on this band

- 2D-7-3.4 The SWR-meter reading at the low-frequency end of an amateur band is 5:1, and the SWR-meter reading at the high-frequency end of the same band is 2.5:1. What does this indicate about your antenna?
- A. The antenna is broadbanded
  - B. The antenna is too long for operation on this band
  - C. The antenna is too short for operation on this band
  - D. The antenna has been optimized for operation on this band

One question must be from the following:

- 2D-8-1.1 What is meant by *receiver overload*?
- A. Interference caused by transmitter harmonics
  - B. Interference caused by overcrowded band conditions
  - C. Interference caused by strong signals from a nearby transmitter
  - D. Interference caused by turning the receiver volume too high

- 2D-8-1.2 What is a likely indication that radio-frequency interference to a receiver is caused by front-end overload?
- A. A low pass filter at the transmitter reduces interference sharply
  - B. The interference is independent of frequency
  - C. A high pass filter at the receiver reduces interference little or not at all
  - D. Grounding the receiver makes the problem worse

- 2D-8-1.3 Your neighbor reports interference to his television whenever you are transmitting from your amateur station. This interference occurs regardless of your transmitter frequency. What is likely to be the cause of the interference?
- A. Inadequate transmitter harmonic suppression
  - B. Receiver VR tube discharge
  - C. Receiver overload
  - D. Incorrect antenna length

- 2D-8-1.4 What type of filter should be installed on a TV receiver as the first step in preventing RF overload from an amateur HF station transmission?
- A. Low pass
  - B. High pass
  - C. Band pass
  - D. Notch

- 2D-8-2.1 What is meant by *harmonic radiation*?
- A. Transmission of signals at whole number multiples of the fundamental (desired) frequency
  - B. Transmission of signals that include a superimposed 60-Hz hum
  - C. Transmission of signals caused by sympathetic vibrations from a nearby transmitter
  - D. Transmission of signals to produce a stimulated emission in the air to enhance skip propagation

- 2D-8-2.2 Why is harmonic radiation from an amateur station undesirable?
- A. It will cause interference to other stations and may result in out-of-band signal radiation
  - B. It uses large amounts of electric power
  - C. It will cause sympathetic vibrations in nearby transmitters
  - D. It will produce stimulated emission in the air above the transmitter, thus causing aurora

- 2D-8-2.3 What type of interference may radiate from a multi-band antenna connected to an improperly tuned transmitter?
- A. Harmonic radiation
  - B. Auroral distortion
  - C. Parasitic excitation
  - D. Intermodulation

- 2D-8-2.4 What is the purpose of shielding in a transmitter?
- A. It gives the low pass filter structural stability
  - B. It enhances the microphonic tendencies of radiotelephone transmitters
  - C. It prevents unwanted RF radiation
  - D. It helps maintain a sufficiently high operating temperature in circuit components

- 2D-8-2.5 Your neighbor reports interference on one or two channels of her television when you are transmitting from your amateur station. This interference only occurs when you are operating on 15 meters. What is likely to be the cause of the interference?
- A. Excessive low-pass filtering on the transmitter
  - B. Sporadic E de-ionization near your neighbor's TV antenna
  - C. TV Receiver front-end overload
  - D. Harmonic radiation from your transmitter

- 2D-8-2.6 What type of filter should be installed on an amateur transmitter as the first step in reducing harmonic radiation?
- A. Key click filter
  - B. Low pass filter
  - C. High pass filter
  - D. CW filter

9

8-24-91

2D-8-3.1 If you are notified that your amateur station is causing television interference, what should you do first?

Q15  
Pg 10

- A. Make sure that your amateur equipment is operating properly, and that it does not cause interference to your own television
- B. Immediately turn off your transmitter and contact the nearest FCC office for assistance
- C. Install a high-pass filter at the transmitter output and a low-pass filter at the antenna-input terminals of the TV
- D. Continue operating normally, since you have no legal obligation to reduce or eliminate the interference

2D-8-3.2 Your neighbor informs you that you are causing television interference, but you are sure your amateur equipment is operating properly and you cause no interference to your own TV. What should you do?

Pg 10

- A. Immediately turn off your transmitter and contact the nearest FCC office for assistance
- B. Work with your neighbor to determine that you are actually the cause of the interference
- C. Install a high-pass filter at the transmitter output and a low-pass filter at the antenna-input terminals of the TV
- D. Continue operating normally, since you have no legal obligation to reduce or eliminate the interference

**Subelement 2E—Electrical Principles (4 questions)**

**One question must be from the following:**

2E-1-1.1 Your receiver dial is calibrated in megahertz and shows a signal at 1200 MHz. At what frequency would a dial calibrated in gigahertz show the signal?

- A. 1,200,000 GHz
- B. 12 GHz
- C. 1.2 GHz
- D. 0.0012 GHz

2E-1-2.1 Your receiver dial is calibrated in kilohertz and shows a signal at 7125 kHz. At what frequency would a dial calibrated in megahertz show the signal?

- A. 0.007125 MHz
- B. 7.125 MHz
- C. 71.25 MHz
- D. 7,125,000 MHz

2E-1-2.2 Your receiver dial is calibrated in gigahertz and shows a signal at 1.2 GHz. At what frequency would a dial calibrated in megahertz show the same signal?

- A. 1.2 MHz
- B. 12 MHz
- C. 120 MHz
- D. 1200 MHz

2E-1-3.1 Your receiver dial is calibrated in megahertz and shows a signal at 3.525 MHz. At what frequency would a dial calibrated in kilohertz show the signal?

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

2E-1-3.2 Your receiver dial is calibrated in kilohertz and shows a signal at 3725 kHz. At what frequency would a dial calibrated in Hertz show the same signal?

- A. 3,725 Hz
- B. 3.725 Hz
- C. 37.25 Hz
- D. 3,725,000 Hz

2E-1-4.1 How long (in meters) is an antenna that is 400 centimeters long?

- A. 0.0004 meters
- B. 4 meters
- C. 40 meters
- D. 40,000 meters

2E-1-5.1 What reading will be displayed on a meter calibrated in amperes when it is being used to measure a 3000-milliampere current?

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

2E-1-5.2 What reading will be displayed on a meter calibrated in volts when it is being used to measure a 3500-millivolt potential?

- A. 350 volts
- B. 35 volts
- C. 3.5 volts
- D. 0.35 volts

2E-1-6.1 How many farads is 500,000 microfarads?

- A. 0.0005 farads
- B. 0.5 farads
- C. 500 farads
- D. 500,000,000 farads

7

- 2E-1-7.1 How many microfarads is 1,000,000 picofarads?  
 A. 0.001 microfarads  
 B. 1 microfarad  
 C. 1,000 microfarads  
 D. 1,000,000,000 microfarads

One question must be from the following:

- 2E-2-1.1 What is the term used to describe the flow of electrons in an electric circuit?  
 A. Voltage  
 B. Resistance  
 C. Capacitance  
 D. Current

- 2E-2-2.1 What is the basic unit of electric current?  
 A. The volt  
 B. The watt  
 C. The ampere  
 D. The ohm

- 2E-3-1.1 What supplies the force that will cause electrons to flow through a circuit?  
 A. Electromotive force, or voltage  
 B. Magnetomotive force, or inductance  
 C. Farad force, or capacitance  
 D. Thermodynamic force, or entropy

- 2E-3-1.2 The pressure in a water pipe is comparable to what force in an electrical circuit?  
 A. Current  
 B. Resistance  
 C. Gravitation  
 D. Voltage

- 2E-3-1.3 An electric circuit must connect to two terminals of a voltage source. What are these two terminals called?  
 A. The north and south poles  
 B. The positive and neutral terminals  
 C. The positive and negative terminals  
 D. The entrance and exit terminals

- 2E-3-2.1 What is the basic unit of voltage?  
 A. The volt  
 B. The watt  
 C. The ampere  
 D. The ohm

- 2E-4.1 List at least three good electrical conductors.  
 A. Copper, gold, mica  
 B. Gold, silver, wood  
 C. Gold, silver, aluminum  
 D. Copper, aluminum, paper

- 2E-5.1 List at least four good electrical insulators.  
 A. Glass, air, plastic, porcelain  
 B. Glass, wood, copper, porcelain  
 C. Paper, glass, air, aluminum  
 D. Plastic, rubber, wood, carbon

- 2E-6-1.1 There is a limit to the electric current that can pass through any material. What is this current limiting called?  
 A. Fusing  
 B. Reactance  
 C. Saturation  
 D. Resistance

- 2E-6-1.2 What is an electrical component called that opposes electron movement through a circuit?  
 A. A resistor  
 B. A reactor  
 C. A fuse  
 D. An oersted

- 2E-6-2.1 What is the basic unit of resistance?  
 A. The volt  
 B. The watt  
 C. The ampere  
 D. The ohm

One question must be from the following:

- 2E-7.1 What electrical principle relates voltage, current and resistance in an electric circuit?  
 A. Ampere's Law  
 B. Kirchhoff's Law  
 C. Ohm's Law  
 D. Tesla's Law

- 2E-7.2 There is a 2-amp current through a 50-ohm resistor. What is the applied voltage?  
 A. 0.04 volts  
 B. 52 volts  
 C. 100 volts  
 D. 200 volts

- 2E-7.3 If 200 volts is applied to a 100-ohm resistor, what is the current through the resistor?  
 A. 0.5 amps  
 B. 2 amps  
 C. 50 amps  
 D. 20000 amps

- 2E-7.4 There is a 3-amp current through a resistor and we know that the applied voltage is 90 volts. What is the value of the resistor?  
 A. 0.03 ohms  
 B. 10 ohms  
 C. 30 ohms  
 D. 2700 ohms

- 2E-8.1 What is the term used to describe the ability to do work?  
 A. Voltage  
 B. Power  
 C. Inertia  
 D. Energy

- 2E-8.2 What is converted to heat and light in an electric light bulb?  
 A. Electrical energy  
 B. Electrical voltage  
 C. Electrical power  
 D. Electrical current

- 2E-9-1.1 What term is used to describe the rate of energy consumption?  
 A. Energy  
 B. Current  
 C. Power  
 D. Voltage

- 2E-9-1.2 You have two lamps with different wattage light bulbs in them. How can you determine which bulb uses electrical energy faster?  
 A. The bulb that operates from the higher voltage will consume energy faster  
 B. The physically larger bulb will consume energy faster  
 C. The bulb with the higher wattage rating will consume energy faster  
 D. The bulb with the lower wattage rating will consume energy faster

- 2E-9-2.1 What is the basic unit of electrical power?  
 A. Ohm  
 B. Watt  
 C. Volt  
 D. Ampere

13

8-24-91

- 2E-10.1 What is the term for an electrical circuit in which there can be no current?
- A. A closed circuit
  - B. A short circuit
  - C. An open circuit
  - D. A hyper circuit

- 2E-11.1 What is the term for a failure in an electrical circuit that causes excessively high current?
- A. An open circuit
  - B. A dead circuit
  - C. A closed circuit
  - D. A short circuit

One question must be from the following:

- 2E-12-1.1 What is the term used to describe a current that flows only in one direction?
- A. Alternating current
  - B. Direct current
  - C. Periodic current
  - D. Pulsating current

- 2E-12-2.1 What is the term used to describe a current that flows first in one direction, then in the opposite direction, over and over?
- A. Alternating current
  - B. Direct current
  - C. Negative current
  - D. Positive current

- 2E-12-3.1 What is the term for the number of complete cycles of an alternating waveform that occur in one second?
- A. Pulse repetition rate
  - B. Hertz
  - C. Frequency per wavelength
  - D. Frequency

- 2E-12-3.2 A certain AC signal makes 2000 complete cycles in one second. What property of the signal does this number describe?
- A. The frequency of the signal
  - B. The pulse repetition rate of the signal
  - C. The wavelength of the signal
  - D. The hertz per second of the signal

- 2E-12-3.3 What is the basic unit of frequency?
- A. The hertz
  - B. The cycle
  - C. The kilohertz
  - D. The megahertz

- 2E-12-4.1 What range of frequencies are usually called *audio frequencies*?
- A. 0 to 20 Hz
  - B. 20 to 20,000 Hz
  - C. 200 to 200,000 Hz
  - D. 10,000 to 30,000 Hz

- 2E-12-4.2 A signal at 725 Hz is in what frequency range?
- A. Audio frequency
  - B. Intermediate frequency
  - C. Microwave frequency
  - D. Radio frequency

- 2E-12-4.3 Why do we call signals in the range 20 Hz to 20,000 Hz *audio frequencies*?
- A. Because the human ear rejects signals in this frequency range
  - B. Because the human ear responds to sounds in this frequency range
  - C. Because frequencies in this range are too low for a radio to detect
  - D. Because a radio converts signals in this range directly to sounds the human ear responds to

- 2E-12-5.1 Signals above what frequency are usually called *radio-frequency* signals?

- A. 20 Hz
- B. 2000 Hz
- C. 20,000 Hz
- D. 1,000,000 Hz

- 2E-12-5.2 A signal at 7125 kHz is in what frequency range?
- A. Audio frequency
  - B. Radio frequency
  - C. Hyper-frequency
  - D. Super-high frequency

- 2E-13.1 What is the term for the distance an AC signal travels during one complete cycle?
- A. Wave velocity
  - B. Velocity factor
  - C. Wavelength
  - D. Wavelength per meter

- 2E-13.2 In the time it takes a certain radio signal to pass your antenna, the leading edge of the wave travels 12 meters. What property of the signal does this number refer to?
- A. The signal frequency
  - B. The wave velocity
  - C. The velocity factor
  - D. The signal wavelength

9