
Lesson 1: Introduction to Ham Radio

Preparation for
Amateur Radio
Technician Class
Exam

Topics

- Radios
- Amateur Radio
- FCC and ITU
- Classes of Licenses
- Amateur Radio Exams
- Licenses
- Call Signs
- Who does Ham Radio?
- Exam Questions for this section

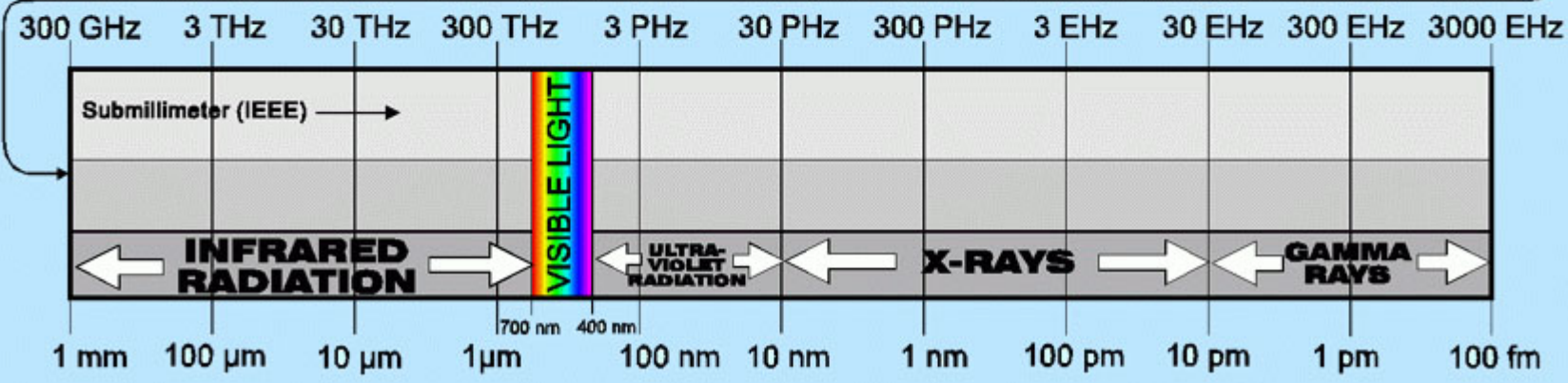
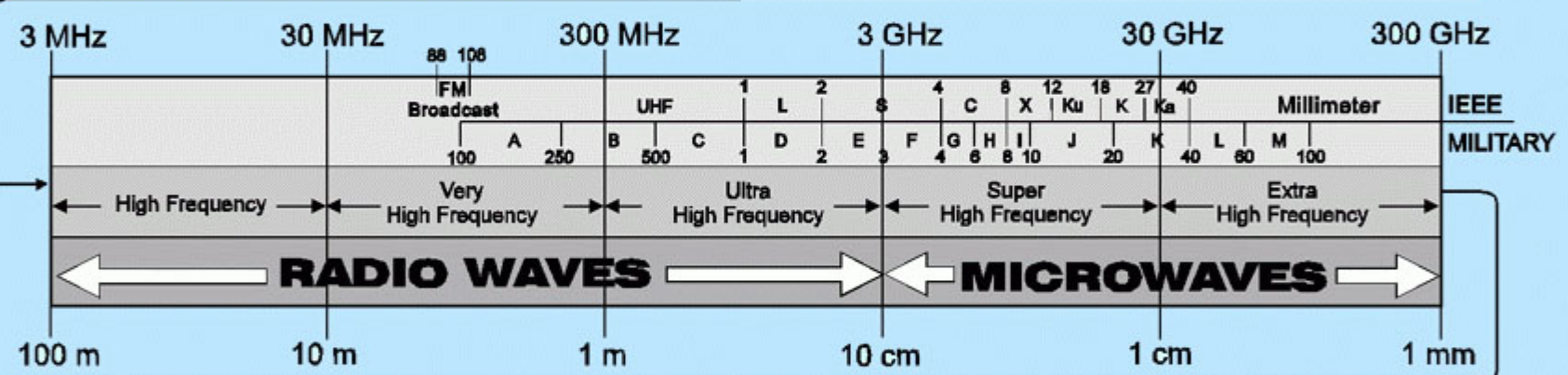
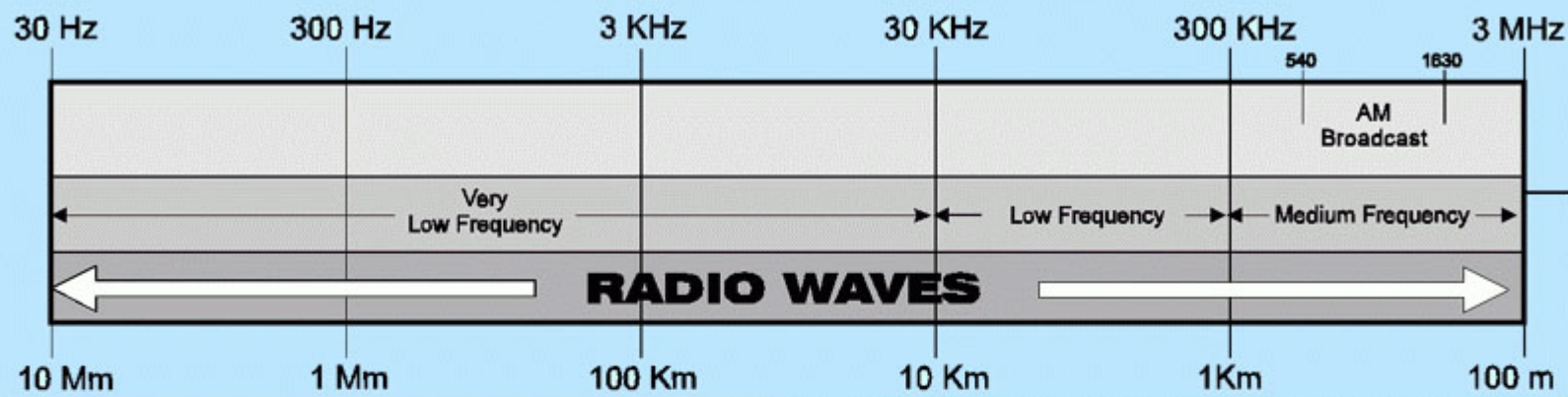
Reading

- Introduction
- Chapter 1 – 1.1-1.14, 1.16-1.17

Radios

- Radios come in all kinds of forms and are used for many purposes
- They all share in common the use of Radio Frequencies
- What is a radio frequency?

RADIO FREQUENCY SPECTRUM



Radios: Uses

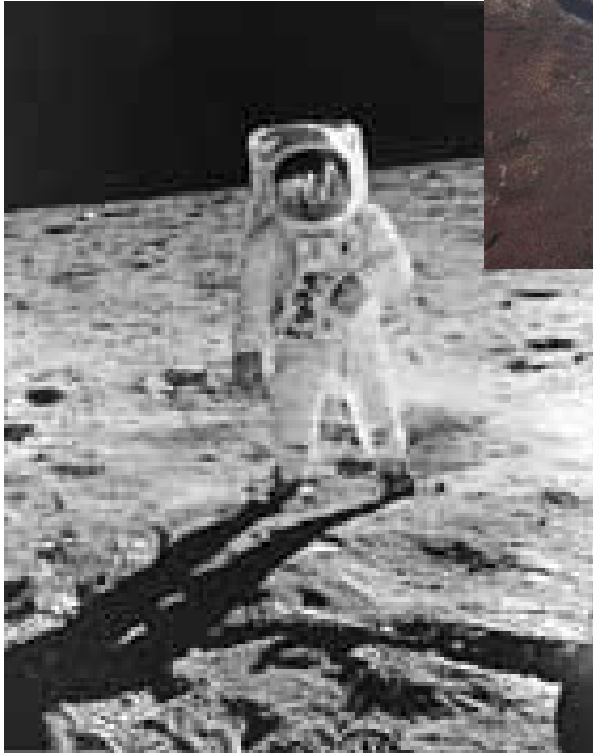
- Questions for the class:
 - Where do you use radios today?
 - Where else do you know of that radios are used?

Radios: Uses



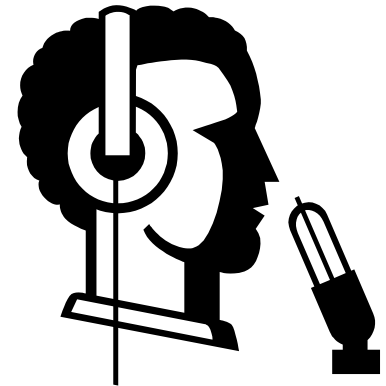
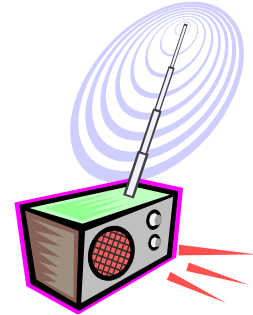
Radios: Uses

NASA photos



Amateur Radio

- An amateur radio station is a radio station in the amateur service used for radio communications
- A station licensee is the person responsible for the proper operation of the station in accordance with the FCC rules
- A control operator is an amateur operator designated by the station licensee to be responsible for transmissions



Amateur Radio

- An amateur space station is an amateur station located more than 50 kilometers above the Earth's surface
 - There is an amateur space station on board the International Space Station
- Any licensed amateur operator can be the control operator of an amateur space station
 - So only astronauts and cosmonauts who are licensed hams can use it!

FCC

- Federal Communications Commission
- This agency makes and enforces the rules for the amateur service in the United States
- The rules we follow are in a document called Part 97
- The FCC established amateur radio for the following purposes:
 - **Increase number of trained radio operators**
 - **Improve international good will**

ITU

- The International Telecommunication Union coordinates radio regulations throughout the world
- There are 3 ITU regions
 - Region 1 = Africa, Europe, Russia, and part of the Middle East
 - Region 2 = North and South America, the Caribbean Islands, Alaska, and Hawaii
 - Region 3 = Australia, China, India, the rest of the Middle East, and Pacific Ocean islands such as Guam

Classes of Amateur License

- Before you can operator an amateur station in the US, the FCC must grant you an amateur operator/primary station license
- There are currently 4 classes of Amateur Operator License granted by the FCC:
 - Technician
 - Technician with Morse Code (historical)
 - General
 - Amateur Extra
- Each license grants you the use of particular radio frequencies

Amateur Radio Exams

- All licenses require you to pass a written test
 - General and Amateur Extra class licenses also require that you pass a test of Morse Code at 5 wpm
- The tests are as follows:
 - Element 1 = Morse Code (5 minutes)
 - Element 2 = Written test for Technician (35 questions)
 - Element 3 = Written test for General (35 questions)
 - Element 4 = Written test for Extra (50 questions)
- You only have to pass each part once 😊

Amateur Radio Exams

- The tests are changed periodically
- Each element has a question pool that is good for 3 years
- There are 35 questions on the Technician test
 - You have to get 26 correct to pass
- You apply for the test on form 605

Amateur Radio Exams

- All tests are given by at least 3 Volunteer Examiners (VE)
 - A VE is an amateur who is accredited by one or more VECs (Amateur Radio Relay League (ARRL) is a VEC)
 - He or she volunteers to administer amateur license exams
- When you pass an Element, the VEs at the test issue you a Certificate of Successful Completion of Examination
 - This is the only thing that proves you passed the test until you receive your license, so don't lose it!

Amateur Radio Exams

- Element 1, Morse Code tests, are used for two different purposes
 - Historically, a Technician could pass Morse Code to get access to additional frequencies below 30 MHz
 - The Certificate of Successful Completion of Examination for Element 1 was the proof that the Technician was legal to operate at those frequencies
 - Today, a Technician passes Morse Code as part of the requirements for a General or Extra license
 - The credit for passing Morse Code for an upgrade is good for 365 days

Amateur Radio Exams

- Usually Element 1 exams are audible
 - If an applicant has a physical disability, the test may be given using a vibrating surface or a flashing light

Licenses

- Licenses are good for 10 years
- You renew your license just by asking for it
 - You don't have to pass another test
 - Renewal can be done no more than 90 days before you license expires
 - You can renew by mail on form 605, or through the Universal Licensing System (ULS) on the World Wide Web
- If you forget to renew, there is a 2 year grace period during which you can get your license back
 - You cannot broadcast until you renew your license

Licenses

- How soon after I pass the exam can I broadcast?
 - As soon as the FCC grants you a license and the data appears in the FCC's ULS database
- You may operate wherever the amateur service is regulated by the FCC
- You can operate as an amateur radio operator in a country other than your home country if there is a reciprocal operating authority between the two countries

Call Signs

- You use your call sign to identify your amateur station when you are transmitting
- Valid call signs in the US start with A, K, N, or W
- They contain a single digit, 0-9
 - A valid US call sign is KB3TMJ

Call Signs

- Call signs are awarded in sequence when you get your license
- A new call sign is created this way:
 - ITU prefix letter(s)
 - Call sign district numeral
 - A suffix in strict alphabetic order
- Oregon is district 7, California is district 6

Call Signs

- In addition, call signs are formatted in groups for each license class
- Group A = Amateur Extra
 - 1x2 or 2x1 format
- Group B = Advanced or Extra
 - 2x2 format
- Group C = Technician or General
 - 1x3 format
- Group D = Novice, Technician or General
 - 2x3 format

Call Signs

- The Vanity Call Sign program lets you apply for any available call sign in your group
- Many people do this to get a call sign with their initials!
- There is a small fee for vanity call signs

Call Signs

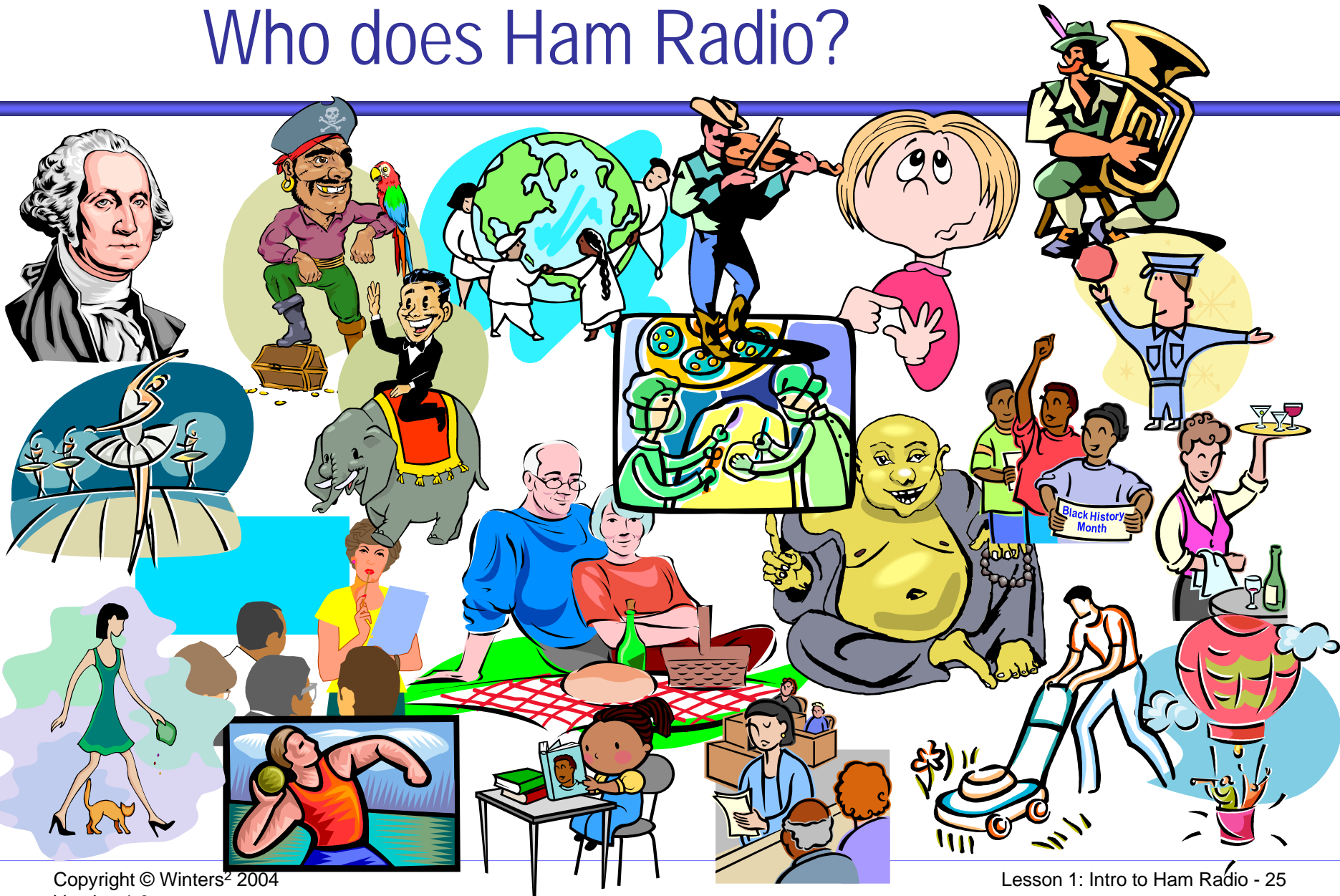
➤ Club signs

- A ham radio club can get a call sign
- One member of the club must be the trustee who is primarily responsible for the license
- The club applies through an FCC-approved Club Station Call Sign Administrator

➤ Special events

- Any licensed amateur can apply for a 15 day or less special event call sign
- This has a 1x1 format
- These special call signs are administered through the FCC-approved Special-Event Call Sign Administrator

Who does Ham Radio?



Who does Ham Radio?

- Anyone can become an amateur licensee in the US except a representative of a foreign government
- There are no age limits

Who can I talk to?

- You can communicate with an amateur in a foreign country at any time, unless it is not allowed by either government
- There is no limit to the distance you can communicate using amateur radio
 - You are limited only by frequencies and power output
 - With the right conditions, you can talk to someone on the other side of the world with relatively low power

Why do Ham Radio?

- Fun
- Meet people all over the world
- Win contests
- Build radios and antennas
- Bounce signals off satellites & the moon
- Community service
- ...

Why are we called Hams?

- Amateur Radio Operators are called Hams
- Why?
- The answer has been lost to history

Exam Questions

- The following slides contain questions from the exam pool that are covered in this section of the notes

T1A01

- T1A01 Who makes and enforces the rules for the amateur service in the United States?
- A. The Congress of the United States
 - B. The Federal Communications Commission (FCC)
 - C. The Volunteer Examiner Coordinators (VECs)
 - D. The Federal Bureau of Investigation (FBI)

T1A02

- T1A02 What are two of the five fundamental purposes for the amateur service in the United States?
- A. To protect historical radio data, and help the public understand radio history
 - B. To help foreign countries improve communication and technical skills, and encourage visits from foreign hams
 - C. To modernize radio schematic drawings, and increase the pool of electrical drafting people
 - D. To increase the number of trained radio operators and electronics experts, and improve international goodwill

T1A03

- T1A03 What is the definition of an amateur station?
- A. A radio station in a public radio service used for radiocommunications
 - B. A radio station using radiocommunications for a commercial purpose
 - C. A radio station using equipment for training new broadcast operators and technicians
 - D. A radio station in the amateur service used for radiocommunications

T1A08

- T1A08 What is an amateur space station?
- A. An amateur station operated on an unused frequency
 - B. An amateur station awaiting its new call letters from the FCC
 - C. An amateur station located more than 50 kilometers above the Earth's surface
 - D. An amateur station that communicates with the International Space Station

T1A09

- T1A09 Who may be the control operator of an amateur space station?
- A. An amateur holding an Amateur Extra class operator license grant
 - B. Any licensed amateur operator
 - C. Anyone designated by the commander of the spacecraft
 - D. No one unless specifically authorized by the government

T1B12

- T1B12 When are you allowed to communicate with an amateur in a foreign country?
- A. Only when the foreign amateur uses English
 - B. Only when you have permission from the FCC
 - C. Only when a third party agreement exists between the US and the foreign country
 - D. At any time, unless it is not allowed by either government

T1B14

- T1B14 What does it mean for an amateur station to operate under reciprocal operating authority?
- A. The amateur is operating in a country other than his home country
 - B. The amateur is allowing a third party to talk to an amateur in another country
 - C. The amateur has permission to communicate in a foreign language
 - D. The amateur has permission to communicate with amateurs in another country

T1C01

- T1C01 Which of the following is required before you can operate an amateur station in the US?
- A. You must hold an FCC operator's training permit for a licensed radio station
 - B. You must submit an FCC Form 605 together with a license examination fee
 - C. The FCC must grant you an amateur operator/primary station license
 - D. The FCC must issue you a Certificate of Successful Completion of Amateur Training

T1C02

- T1C02 What are the US amateur operator licenses that a new amateur might earn?
- A. Novice, Technician, General, Advanced
 - B. Technician, Technician Plus, General, Advanced
 - C. Novice, Technician Plus, General, Advanced
 - D. Technician, Technician with Morse code, General, Amateur Extra

T1C03

- T1C03 How soon after you pass the examination elements required for your first Amateur Radio license may you transmit?
- A. Immediately
 - B. 30 days after the test date
 - C. As soon as the FCC grants you a license and the data appears in the FCC's ULS data base
 - D. As soon as you receive your license from the FCC

T1C04

- T1C04 How soon before the expiration date of your license may you send the FCC a completed Form 605 or file with the Universal Licensing System on the World Wide Web for a renewal?
- A. No more than 90 days
 - B. No more than 30 days
 - C. Within 6 to 9 months
 - D. Within 6 months to a year

T1C05

- T1C05 What is the normal term for an amateur station license grant?
- A. 5 years
 - B. 7 years
 - C. 10 years
 - D. For the lifetime of the licensee

T1C06

- T1C06 What is the "grace period" during which the FCC will renew an expired 10-year license?
- A. 2 years
 - B. 5 years
 - C. 10 years
 - D. There is no grace period

T1C07

- T1C07 What is your responsibility as a station licensee?
- A. You must allow another amateur to operate your station upon request
 - B. You must be present whenever the station is operated
 - C. You must notify the FCC if another amateur acts as the control operator
 - D. You are responsible for the proper operation of the station in accordance with the FCC rules

T1C08

- T1C08 Where does a US amateur license allow you to operate?
- A. Anywhere in the world
 - B. Wherever the amateur service is regulated by the FCC
 - C. Within 50 km of your primary station location
 - D. Only at the mailing address printed on your license

T1C10

- T1C10 To what distance limit may Technician class licensees communicate?
- A. Up to 200 miles
 - B. There is no distance limit
 - C. Only to line of sight contacts distances
 - D. Only to contacts inside the USA

T1C11

- T1C11 If you forget to renew your amateur license and it expires, may you continue to transmit?
- A. No, transmitting is not allowed
 - B. Yes, but only if you identify using the suffix "GP"
 - C. Yes, but only during authorized nets
 - D. Yes, any time for up to two years (the "grace period" for renewal)

T1D01

- T1D01 Who can become an amateur licensee in the US?
- A. Anyone except a representative of a foreign government
 - B. Only a citizen of the United States
 - C. Anyone except an employee of the US government
 - D. Anyone

T1D02

- T1D02 What age must you be to hold an amateur license?
- A. 14 years or older
 - B. 18 years or older
 - C. 70 years or younger
 - D. There are no age limits

T1D03

- T1D03 What government agency grants your amateur radio license?
- A. The Department of Defense
 - B. The State Licensing Bureau
 - C. The Department of Commerce
 - D. The Federal Communications Commission

T1D04

- T1D04 What element credit is earned by passing the Technician class written examination?
- A. Element 1
 - B. Element 2
 - C. Element 3
 - D. Element 4

T1D05

- T1D05 If you are a Technician licensee who has passed a Morse code exam, what is one document you can use to prove that you are authorized to use certain amateur frequencies below 30 MHz?
- A. A certificate from the FCC showing that you have notified them that you will be using the HF bands
 - B. A certificate showing that you have attended a class in HF communications
 - C. A Certificate of Successful Completion of Examination showing that you have passed a Morse code exam
 - D. No special proof is required

T1D06

- T1D06 What is a Volunteer Examiner (VE)?
- A. A certified instructor who volunteers to examine amateur teaching manuals
 - B. An FCC employee who accredits volunteers to administer amateur license exams
 - C. An amateur, accredited by one or more VECs, who volunteers to administer amateur license exams
 - D. An amateur, registered with the Electronic Industries Association, who volunteers to examine amateur station equipment

T1D07

- T1D07 What minimum examinations must you pass for a Technician amateur license?
- A. A written exam, Element 1 and a 5 WPM code exam, Element 2
 - B. A 5 WPM code exam, Element 1 and a written exam, Element 3
 - C. A single 35 question multiple choice written exam, Element 2
 - D. A written exam, Element 2 and a 5 WPM code exam, Element 4

T1D08

- T1D08 How may an Element 1 exam be administered to an applicant with a physical disability?
- A. It may be skipped if a doctor signs a statement saying the applicant is too disabled to pass the exam
 - B. By holding an open book exam
 - C. By lowering the exam's pass rate to 50 percent correct
 - D. By using a vibrating surface or flashing light

T1D09

- T1D09 What is the purpose of the Element 1 examination?
- A. To test Morse code comprehension at 5 words-per-minute
 - B. To test knowledge of block diagrams
 - C. To test antenna-building skills
 - D. To test knowledge of rules and regulations

T1D10

- T1D10 If a Technician class licensee passes only the 5 words-per-minute Morse code test at an exam session, how long will this credit be valid for license upgrade purposes?
- A. 365 days
 - B. Until the current license expires
 - C. Indefinitely
 - D. Until two years following the expiration of the current license

T1D11

- [T1D11 - This question has been formally withdrawn by the QPC. It will not be used on tests.]

T1E01

- T1E01 Which of the following call signs is a valid US amateur call?
- A. UZ4FWD
 - B. KBL7766
 - C. KB3TMJ
 - D. VE3BKJ

T1E02

- T1E02 What letters must be used for the first letter in US amateur call signs?
- A. K, N, U and W
 - B. A, K, N and W
 - C. A, B, C and D
 - D. A, N, V and W

T1E03

- T1E03 What numbers are normally used in US amateur call signs?
- A. Any two-digit number, 10 through 99
 - B. Any two-digit number, 22 through 45
 - C. A single digit, 1 through 9
 - D. A single digit, 0 through 9

T1E04

- T1E04 In which ITU region is Alaska?
- A. ITU Region 1
 - B. ITU Region 2
 - C. ITU Region 3
 - D. ITU Region 4

T1E05

- T1E05 In which ITU region is Guam?
- A. ITU Region 1
 - B. ITU Region 2
 - C. ITU Region 3
 - D. ITU Region 4

T1E06

- T1E06 What must you transmit to identify your amateur station?
- A. Your "handle"
 - B. Your call sign
 - C. Your first name and your location
 - D. Your full name

T1E07

- T1E07 How might you obtain a call sign made up of your initials?
- A. Under the vanity call sign program
 - B. In a sequential call sign program
 - C. In the special event call sign program
 - D. There is no provision for choosing a call sign

T1E08

- [T1E08 - This question has been formally withdrawn by the QPC. It will not be used on tests.]

T1E09

- T1E09 How may an amateur radio club obtain a station call sign?
- A. You must apply directly to the FCC in Gettysburg, PA
 - B. You must apply through a Club Station Call Sign Administrator
 - C. You must submit FCC Form 605 to FCC in Washington, DC
 - D. You must notify VE team on NCVEC Form 605

T1E10

- T1E10 Amateurs of which license classes are eligible to apply for temporary use of a 1-by-1 format Special Event call sign?
 - A. Only Amateur Extra class amateurs
 - B. 1-by-1 format call signs are not authorized in the US Amateur Service
 - C. Any FCC-licensed amateur
 - D. Only trustees of amateur radio clubs

T1E11

- T1E11 How does the FCC issue new amateur radio call signs?
- A. By call sign district in random order
 - B. The applicant chooses a call sign no one else is using
 - C. By ITU prefix letter(s), call sign district numeral and a suffix in strict alphabetic order
 - D. The Volunteer Examiners who gave the exams choose a call sign no one else is using

T1E12

- T1E12 Which station call sign format groups are available to Technician Class amateur radio operators?
- A. Group A
 - B. Group B
 - C. Only Group C
 - D. Group C and D