W9AY STUDY GUIDE · ELEMENT 2 · FREE SAMPLE

Technician Class

NCVEC 2026–2030 question pool, errata issued February 19, 2026

35	409	35	2.6 h
EXAM QUESTIONS	IN THE POOL	QUESTION GROUPS	TO READ ONCE

This is one section, free. T4, Amateur Radio Practices: all 23 of its pool questions, each with its answer. Read the notes, then cover the answers and work through the questions, and watch how quickly the answers start to stick. The rest of the guide works the same way.

Get the full guide: w9ay.com/study/technician. It adds a Start Here chapter, all 10 sections and every one of the 409 pool questions. Pay through Stripe; your download link appears as soon as you pay and is emailed to you.

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35 questions on the exam, drawn from 409 in the pool.

SECTION	TOPIC	ON THE EXAM	IN THE POOL	READING
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T4 — Amateur Radio Practices

2 of your 35 exam questions · 2 groups (T4A–T4B) · 23 questions in the pool

The "getting a station on the air and running it" subelement: connecting a microphone, an RF (radio frequency) power meter, a power source, a computer, and digital equipment; an SWR (standing wave ratio) meter; bonding; and mobile radio installation, plus the everyday operating controls — tuning, filters, squelch, AGC (automatic gain control), memory channels, noise blanker, RIT (receiver incremental tuning), and DMR (digital mobile radio) code plugs. Small and hands-on, like G6 in the General pool — two groups, 23 questions, and nothing here requires math or a table of numbers to memorize. Learn what each control and connection actually does and both questions fall into place.

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T4A — Station setup: connecting a microphone, RF power meter, a power source, a computer, digital equipment, an SWR meter; bonding; Mobile radio installation

One exam question comes from this group. 12 questions in the pool.

Mobile power. A typical 50-watt mobile FM (frequency modulation) transceiver wants **13.8 volts at 12 amperes** — the standard nominal voltage of a vehicle's regulated 12-volt system, sized to the current the radio actually draws at full output. DC (direct current) power leads should be **short and heavy-gauge to minimize voltage drop when transmitting**, not for RFI (radio-frequency interference) or impedance-matching reasons. The **negative power return of a mobile transceiver belongs at the 12-volt battery's chassis ground**, not on the mounting bracket or "any metal part of the vehicle" — a direct path back to the battery avoids ground loops and noise picked up elsewhere in the chassis.

Metering. An accessory **SWR meter should be chosen for the frequency and power level at which the measurements will be made** (SWR = standing wave ratio) — meters have operating ranges. An **RF power meter installs in the feed line, between the transmitter and the antenna** (RF = radio frequency), reading the power actually flowing to the load.

Computer and digital mode connections. A computer-radio interface for digital modes carries three signals: **receive audio, transmit audio, and transmitter keying**. One of the required connections is **computer "line in" to the transceiver's speaker connector** — the computer receives the radio's received audio on its line-in port.

For **FT8** specifically, the transceiver's audio input and output simply connect **to the audio output and input of a computer running FT8 software** — no separate terminal node controller or conversion box. A **digital mode hotspot** performs **communication with a digital voice or data network** for nearby transceivers, bridging local radios to an internet-linked system.

Bonding and accessories. Flat copper strap is the preferred conductor for **bonding at RF**, because its low inductance keeps ground connections effective at radio frequencies — braid, wire, and twisted pair all fall short by comparison. Battery runtime is found by **dividing the battery's ampere-hour rating by the equipment's average current draw**. An **electronic keyer is a device that assists in manual sending of Morse code**, not an automatic sender or an antenna switch.

All 12 pool questions for T4A

T4A01

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

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

Answer: D

T4A02

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

- A. The frequency and power level at which the measurements will be made
- B. The distance that the meter will be located from the antenna
- C. The maximum SWR anticipated on the transmission line
- D. The ability of the meter to compensate for a poor transmission line match to the antenna

Answer: A

T4A03

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

- A. To minimize voltage drop when transmitting
- B. To provide a close match to the power supply output impedance
- C. To avoid RF interference
- D. To minimize radiative losses in the power cable

Answer: A

T4A04

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

- A. To a computer running a terminal program and connected to a terminal node controller unit
- B. To the audio output and input of a computer running FT8 software

- C. To an FT8 conversion unit, a keyboard, and a computer monitor
- D. To a computer connected to the FT8converter.com website

Answer: B

T4A05

Where should an RF power meter be installed?

- A. In the feed line, between the transmitter and antenna
- B. At the power supply output
- C. In parallel with the push-to-talk line and the antenna
- D. In the power supply cable, as close as possible to the radio

Answer: A

T4A06

What signals are used in a computer-radio interface for digital mode operation?

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

Answer: C

T4A07

Which of the following is one of the connections required between a computer and a transceiver to operate digital modes?

- A. Computer "line out" to transceiver push-to-talk
- B. Computer "line in" to transceiver push-to-talk
- C. Computer "line in" to transceiver speaker connector
- D. Computer "line out" to transceiver speaker connector

Answer: C

T4A08

Which of the following conductors is preferred for bonding at RF?

- A. Copper braid removed from coaxial cable
- B. Copper-clad steel wire
- C. Twisted-pair cable
- D. Flat copper strap

Answer: D

T4A09

How can you determine the length of time that equipment can be powered from a battery?

- A. Divide the watt-hour rating of the battery by the peak power consumption of the equipment
- B. Divide the battery ampere-hour rating by the average current draw of the equipment
- C. Multiply the watts per hour consumed by the equipment by the battery power rating
- D. Multiply the square of the current rating of the battery by the input resistance of the equipment

Answer: B

T4A10

What function does a digital mode hotspot perform for nearby transceivers?

- A. Communication with a digital voice or data network
- B. FT8 digital communications via AFSK using a smartphone connected to the internet
- C. RTTY encoding and decoding without a computer
- D. High-speed digital communications for meteor scatter

Answer: A

T4A11

Where should the negative power return of a mobile transceiver be connected in a vehicle?

- A. At the 12-volt battery chassis ground
- B. To the shell of the power connector
- C. To any metal part of the vehicle
- D. Through the transceiver's mounting bracket

Answer: A

T4A12

What is an electronic keyer?

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

Answer: C

T4B — Operating controls: frequency tuning, use of filters, squelch function, AGC, memory channels, noise blanker, microphone gain, receiver incremental tuning (RIT), bandwidth selection, scanning function; Digital transceiver configuration; DMR code plugs and talk groups

One exam question comes from this group. 11 questions in the pool.

Microphone and frequency entry. Excessive microphone gain on SSB causes distorted transmitted audio — overdriving the mic stage clips and splatters the signal rather than shifting frequency or raising SWR (standing wave ratio). A transceiver's **operating frequency is entered with the keypad or the VFO knob** (VFO = variable-frequency oscillator), not through a CTCSS/DTMF (continuous tone-coded squelch system / dual-tone multi-frequency) encoder or automatic frequency control.

FM reception. Squelch is adjusted for a weak FM signal by setting the threshold low enough that receiver output audio is on all the time — turning up the audio level alone does nothing if the signal never crosses the squelch threshold. An **FM signal received slightly off frequency sounds distorted**, a direct consequence of how an FM (frequency modulation) discriminator responds to a carrier that isn't centered. The **scanning function tunes through a range of frequencies checking for activity**, stopping when it finds a signal.

SSB and filtering. If a station answering your CQ (a general call to any station) sounds too high- or low-pitched, reach for the **RIT (receiver incremental tuning) or Clarifier** — it shifts your receive frequency without moving your transmit frequency. Having a **choice of receiver filter bandwidths lets you reduce noise or interference by matching the filter to the mode** in use — wide for full-fidelity audio, narrow to squeeze out adjacent noise. For SSB (single sideband) specifically, **2400 Hz gives the best signal-to-noise ratio** of the bandwidth choices — narrow enough to cut noise, wide enough not to clip the voice audio a well-tuned SSB signal needs.

Digital transceiver configuration. A **DMR "code plug" is configuration data loaded onto the radio to give it access to repeaters and talkgroups** (DMR = digital mobile radio) — not a cable, a software upgrade, or a CODEC (coder-decoder). A **specific group of stations on a DMR radio is selected by entering the group's identification code** (its talkgroup ID). Before transmitting on **D-STAR**, the radio must have **your call sign** programmed into it — every D-STAR transmission carries it.

All 11 pool questions for T4B

T4B01

What is the effect of excessive microphone gain on SSB transmissions?

- A. Frequency instability
- B. Distorted transmitted audio
- C. Increased SWR
- D. Sideband inversion

Answer: B

T4B02

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

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

Answer: A

T4B03

How is squelch adjusted so that a weak FM signal can be heard?

- A. Set the squelch threshold so that receiver output audio is on all the time
- B. Turn up the audio level until it overcomes the squelch threshold
- C. Turn on the anti-squelch function
- D. Enable squelch enhancement

Answer: A

T4B04

What does an FM signal sound like when received slightly off frequency?

- A. The audio increases in pitch
- B. The audio decrease in pitch
- C. There is no effect except for reduction in amplitude
- D. The audio becomes distorted

Answer: D

T4B05

What does the scanning function of an FM transceiver do?

- A. Checks incoming signal deviation
- B. Prevents interference to nearby repeaters
- C. Tunes through a range of frequencies to check for activity
- D. Tunes through a range of frequencies to determine the antenna's resonant frequency

Answer: C

T4B06

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

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

Answer: D

T4B07

What is a DMR "code plug"?

- A. An adapter cable used to connect a DMR radio to a computer for internet access
- B. Configuration data loaded onto your radio to access repeaters and talkgroups
- C. An upgrade to DMR programming software provided by the radio manufacturer to accommodate new radio models
- D. A Coder-Decoder (CODEC) that converts analog voice data to DMR digital data and vice versa

Answer: B

T4B08

What is the advantage of having a choice of receiver filter bandwidths in a multimode transceiver?

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

Answer: B

T4B09

How is a specific group of stations selected on a DMR digital voice transceiver?

- A. By retrieving the frequencies from transceiver memory
- B. By enabling the group's CTCSS tone
- C. By entering the group's identification code
- D. By inserting a five-pin, pre-programmed code plug

Answer: C

T4B10

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

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

Answer: C

T4B11

Which of the following must be programmed into a D-STAR digital transceiver before transmitting?

- A. Your call sign
- B. Your output power
- C. The codec type being used
- D. All these choices are correct

Answer: A

Want the rest?

Get the full guide

The complete Technician Class guide is one PDF: a Start Here chapter (where the exam's 35 questions come from and what to learn first), all 10 sections and every one of the 409 pool questions, each with its answer.

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What the full guide covers

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