

YOUR FREE READER'S COMPANION

The Technician Exam Cram Pack

A companion to The Ham Radio Technician Class License Study Guide · by Dale Whitman

Thanks for picking up the study guide. This companion is built for the last two weeks before your Technician exam. It boils the whole 2026-2030 Element 2 pool down to the band edges, formulas, and numbers the test asks over and over, plus 50 rapid-fire flashcards you can quiz yourself on out loud. Read the book to understand these things. Use this pack to lock them in. If a value here ever looks different from something you half-remember, trust this pack: every number was checked against the current 2026-2030 Technician question pool and FCC Part 97.

Nobody fails the Technician exam because the material is hard. They fail because they never boiled it down and never drilled the handful of numbers that are pure recall. This pack is the boil-down: the band edges, the power limits, the four little formulas, the RF safety values, and the operating facts that show up again and again. Cover the answers, say them out loud, and by test day they will be automatic. You need 26 of 35, not a perfect score. You have done the studying. This is how you make it stick. - Dale

High-Yield Cram Sheet

Technician VHF, UHF, and Microwave Bands (memorize the edges)

Above 30 MHz you hold every privilege a Technician is allowed: voice, data, and image modes. This is where almost all of your on-air life happens.

Band	Frequency range	Notes
6 meters	50.0 - 54.0 MHz	50.0 - 50.1 MHz is CW only
2 meters	144.0 - 148.0 MHz	144.0 - 144.1 MHz is CW only; your main FM band
1.25 meters	222 - 225 MHz	All modes (219 - 220 MHz is data forwarding only)
70 centimeters	420 - 450 MHz	Full privileges; heavy repeater use
33 centimeters	902 - 928 MHz	Full privileges
23 centimeters	1240 - 1300 MHz	Full privileges

Technician HF Privileges (learn these cold)

On three of the four HF bands you are limited to CW (Morse code). No code test is required to earn the license; you are simply allowed to transmit CW there. The only place a Technician can talk on HF with a microphone is the top slice of 10 meters.

Band	Frequency range	Modes allowed for a Technician
80 meters	3.525 - 3.600 MHz	CW only
40 meters	7.025 - 7.125 MHz	CW only
15 meters	21.025 - 21.200 MHz	CW only
10 meters	28.000 - 28.300 MHz	CW, RTTY, data
10 meters	28.300 - 28.500 MHz	CW and SSB phone (voice)

Memory hook: on HF a Technician has voice on only one band, 10 meters, and only in the 28.300 to 28.500 MHz slice. Everywhere else on HF it is CW or digital.

Power Limits

Where	Maximum power
Technician HF segments (80, 40, 15, 10 m)	200 watts PEP
Above 30 MHz (VHF, UHF, microwave)	1500 watts PEP

The single most-tested power idea is not a number. It is a rule: use the minimum power necessary to carry out the communication.

Exam Facts

Fact	Value
Questions on the exam	35 multiple choice
Number correct to pass	26 (about 74 percent)
Question pool in effect	2026-2030 pool
Pool effective date	July 1, 2026
Pool expires	June 30, 2030
Total questions in the pool	409
Subelements	10 (T1 through T0)
How the exam is built	1 question drawn from each question group
Morse code required	No
Who administers the exam	Volunteer Examiners under a VEC

Operating Numbers

Item	Value
2 meter repeater offset	plus or minus 600 kHz
70 centimeter repeater offset	plus or minus 5 MHz
1.25 meter repeater offset	plus or minus 1.6 MHz
National 2 m FM simplex calling frequency	146.520 MHz
CTCSS	Sub-audible tone that opens a repeater's squelch
Call a station	Their call sign first, then yours
Station ID	Every 10 minutes and at the end of a contact
RST on voice	Readability 1 to 5, Strength 1 to 9 (drop Tone)

Q signals: QTH = location, QSO = a contact, QRM = interference, QSY = change frequency, QRZ = who is calling me.

Phonetic alphabet: Alfa, Bravo, Charlie, Delta, Echo, Foxtrot, Golf, Hotel, India, Juliett, Kilo, Lima, Mike, November, Oscar, Papa, Quebec, Romeo, Sierra, Tango, Uniform, Victor, Whiskey, X-ray, Yankee, Zulu.

Part 97 Rule Highlights

- Amateur radio is a noncommercial service. Purposes include emergency communication, advancing the radio art, building operator skill, and international goodwill.
- Every transmitting station must have a control operator holding a valid FCC amateur license. The control operator's license class sets the privileges in use.

- US call signs start with A, K, N, or W.
- Prohibited: music, business or paid communications, obscene language, unidentified transmissions, codes to hide meaning, broadcasting to the public, false or deceptive signals.
- Station identification on voice must be in English.
- A space station is more than 50 km above the Earth. A beacon aids propagation study.

Modes by Bandwidth (narrowest to widest)

Mode	Approximate bandwidth	Typical use
CW (Morse)	About 150 Hz	Weak-signal, long distance
SSB voice	About 2 to 3 kHz	HF and VHF/UHF weak-signal distance
FM voice	About 10 to 15 kHz	Repeaters, local 2 m and 70 cm
Fast-scan TV (AM)	About 6 MHz	Rare; the wide extreme

Digital systems to recognize: FT8 (weak-signal data, computer plus radio), Winlink (email over radio, no internet), DMR (digital voice with talkgroups and codeplugs), APRS (packet data for GPS position reporting).

RF Safety Numbers

Concept	Value
RF is what kind of radiation?	Non-ionizing (it heats, it does not damage DNA)
Band with the lowest (most restrictive) MPE	50 MHz (6 meters)
Averaging time, controlled environment	6 minutes
Averaging time, uncontrolled environment	30 minutes
Cut duty cycle 100% to 50%	Allowable power density increases by 2
Who is responsible for RF compliance	The station licensee
Re-evaluate the station when	You change the transmitter or antenna system
Dangerous voltage (shock)	30 volts and above

Formula and Number Card

You do not need a scientific calculator. A simple four-function calculator is allowed at the session, and every formula here is arithmetic.

Ohm's Law ($E = I \text{ times } R$)

E is voltage in volts, I is current in amperes, R is resistance in ohms.

To find	Formula
Voltage	$E = I \text{ times } R$
Current	$I = E \text{ divided by } R$
Resistance	$R = E \text{ divided by } I$

Triangle trick: picture E on top with I and R side by side underneath. Cover the one you want. E is I times R, I is E over R, R is E over I.

Power ($P = I \text{ times } E$)

To find	Formula
Power	$P = I \text{ times } E$
Current	$I = P \text{ divided by } E$
Voltage	$E = P \text{ divided by } I$

Worked example the pool likes: 13.8 volts across a load drawing 10 amperes is 138 watts (13.8 times 10). Also useful: $P = I \text{ squared times } R$, and $P = E \text{ squared divided by } R$.

Wavelength and Antenna Length

Frequency f is in MHz. Wavelength comes out in meters; antenna lengths come out in feet.

To find	Formula
Wavelength in meters	$\text{wavelength} = 300 \text{ divided by } f \text{ (MHz)}$
Half-wave dipole in feet	$\text{length} = 468 \text{ divided by } f \text{ (MHz)}$
Quarter-wave vertical or whip in feet	$\text{length} = 234 \text{ divided by } f \text{ (MHz)}$

Worked examples: a half-wave dipole for 28.4 MHz is $468 / 28.4$, about 16.5 feet. A quarter-wave whip for 146 MHz is $234 / 146$, about 1.6 feet.

Decibels (dB)

A decibel compares two power levels. Decibels add while the power multiplies.

Power change	Change in dB
Double the power (2x)	plus 3 dB
Half the power	minus 3 dB
Four times the power	plus 6 dB
One quarter the power	minus 6 dB
Ten times the power	plus 10 dB
One tenth the power	minus 10 dB

The two to lock in: 3 dB is a factor of two, 10 dB is a factor of ten.

Metric Prefixes

Prefix	Symbol	Multiplier
giga	G	1,000,000,000
mega	M	1,000,000
kilo	k	1,000
centi	c	0.01
milli	m	0.001
micro	u	0.000001
nano	n	0.000000001
pico	p	0.000000000001

Quick conversions: 1.5 amperes is 1500 milliamperes. 1.5 megahertz is 1500 kilohertz. 3.525 MHz is 3525 kHz. 1,000,000 picofarads is 1 microfarad.

SWR at a Glance

SWR reading	What it means
1:1	Perfect match; all power reaches the antenna
2:1, 3:1, or worse	Some power reflected back; the bigger the number, the worse the match

Common causes of high SWR: antenna is the wrong length for the frequency, or a bad, corroded, or damaged connector or feed line.

50 Rapid-Fire Flashcards

Cover the right column, say the answer out loud, then check yourself. Do the whole set the night before and again the morning of.

Question	Answer
How many questions on the Technician exam?	35 multiple choice
How many correct to pass?	26 (about 74 percent)
When did the current pool take effect?	July 1, 2026
When does the current pool expire?	June 30, 2030
How many questions in the pool?	409
Which exam element is Technician?	Element 2
Who administers the exam?	Volunteer Examiners under a VEC
Is Morse code required?	No
What agency regulates US amateur radio?	The FCC
What is the amateur rulebook called?	Part 97
US call signs begin with which letters?	A, K, N, or W
How often must you identify?	Every 10 minutes and at the end of a contact
What language for voice station ID?	English
Is transmitting music allowed?	No
Who is responsible for a station's transmissions?	The control operator
A Technician controls an Extra's station. Whose privileges apply?	Technician (the control operator's class)
What is the 2 meter band range?	144.0 to 148.0 MHz
What is the 70 cm band range?	420 to 450 MHz
What is the 6 meter band range?	50.0 to 54.0 MHz
Only HF band with Technician voice?	10 meters, 28.300 to 28.500 MHz
Mode on 80, 40, and 15 meters for a Technician?	CW only
Technician power limit on HF?	200 watts PEP
Technician power limit above 30 MHz?	1500 watts PEP
Required power level to use?	Minimum necessary
Standard 2 meter repeater offset?	Plus or minus 600 kHz
Standard 70 cm repeater offset?	Plus or minus 5 MHz
National 2 m FM simplex calling frequency?	146.520 MHz

Sub-audible tone that opens a repeater?	CTCSS
How do you answer a CQ?	Their call sign, then yours
What does QSY mean?	Change frequency
What does QTH mean?	My location
What does QRM mean?	Interference
Voice RST ranges?	Readability 1 to 5, Strength 1 to 9
Phonetic for the letter B?	Bravo
Is a band plan FCC law?	No, a voluntary guideline
Ohm's law for voltage?	$E = I \text{ times } R$
Power formula?	$P = I \text{ times } E$
Half-wave dipole length in feet?	468 divided by f in MHz
Quarter-wave vertical length in feet?	234 divided by f in MHz
Wavelength in meters?	300 divided by f in MHz
A 3 dB change is a factor of?	Two (double or half)
A 10 dB change is a factor of?	Ten
Ideal SWR reading?	1:1
Which coax has lower loss, RG-58 or RG-213?	RG-213 (thicker)
Narrowest common mode?	CW, about 150 Hz
Widest common voice mode?	FM, about 10 to 15 kHz
Which system sends email over radio?	Winlink
What kind of radiation is RF?	Non-ionizing
Band with the lowest MPE limit?	50 MHz
Voltage generally considered dangerous?	30 volts and above

That is the whole pack. Drill the band edges, the four formulas, and the safety numbers until they are automatic, then trust yourself. You need 26 out of 35. Walk in, read carefully, and go earn your call sign. - Dale