## TECH TEST Cheat Sheet

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One of the problems with the Technician Class amateur radio license exam is that so many questions can be answered correctly only by memorizing the answers. If any of these questions came up in real life, one would consult a book for the correct equation or information.

That being the case, I'm offering this "cheat sheet" that someone could use while taking practice tests to answer these questions. Just don't get too dependent on this cheat sheet, as you won't be able to use while taking the real test, at least not yet anyway.

## Ohm's Law

$\mathrm{E}=\mathrm{I} \times \mathrm{R}$
$\mathrm{I}=\mathrm{E} / \mathrm{R}$
$\mathrm{R}=\mathrm{E} / \mathrm{I}$
where E is the voltage across a circuit, I is the current flowing through the circuit, and R is the resistance of the circuit.

## DC power equations

P = ExI
$\mathrm{E}=\mathrm{P} / \mathrm{I}$
$\mathrm{I}=\mathrm{P} / \mathrm{E}$
where P is the power being generated or consumed by a circuit or system, E is the voltage across the circuit or system, and I is the current flowing through the circuit or system.

## Scientific notation prefixes and numeric equivalents

| Prefix | Abbreviation | Numerical | Exponential |
| :--- | :--- | :--- | :--- |
| giga- | G | $1,000,000,000$ | $10^{9}$ |
| mega- | M | $1,000,000$ | $10^{6}$ |
| kilo- | k | 1,000 | $10^{3}$ |
| --- | ---- | 1 | $10^{0}$ |
| milli- | m | 0.001 | $10^{-3}$ |
| micro- | $\mu, \mathrm{u}$ | 0.000001 | $10^{-6}$ |
| nano- | n | 0.000000001 | $10^{-9}$ |
| pico- | p | 0.000000000001 | $10^{-12}$ |

## Decibels and the equivalent linear ratios

For the Tech test, you don't need to know how to calculate the power ratio in dB . All you need to know are these three values: $3 \mathrm{~dB}, 6 \mathrm{~dB}$, and 10 dB .

| Value in dB | Power Ratio | Value in dB | Power Ratio |
| :---: | :---: | :---: | :---: |
| 3 db | $2: 1$ | -3 dB | $0.5: 1$ |
| 6 dB | $4: 1$ | -6 dB | $0.25: 1$ |
| 10 dB | $10: 1$ | -10 dB | $0.1: 1$ |

## Frequency to wavelength and wavelength to frequency equations

wavelength $(\mathrm{m})=300,000,000 /$ frequency $(\mathrm{Hz})=300 /$ frequency $(\mathrm{MHz})$
frequency $(\mathrm{Hz})=300,000,000 /$ wavelength $(\mathrm{m})$
frequency $(\mathrm{MHz})=300 /$ wavelength $(\mathrm{m})$

## Equations for calculating half-wave and quarter-wave antenna lengths

For a half-wave dipole antenna, length $(\mathrm{ft})=$.468 / frequency $(\mathrm{MHz})$
For a quarter wave vertical, length $(\mathrm{ft})=$.234 / frequency $(\mathrm{MHz})$

## 2-meter and $\mathbf{7 0 - c m}$ band repeater offsets

2-meter band: $\pm 600 \mathrm{kHz}$
$70-\mathrm{cm}$ band: $\pm 5 \mathrm{MHz}$


630 Meters ( 472 kHz)


160 Meters (1.8 MHz)
Avoid interference to radiolocation operations
from 1.900 to 2.000 MHz


80 Meters (3.5 MHz)


60 Meters (5.3 MHz)


USB305 534655357.05371 .55403 .5 Hz
Genera, Advanced, andAmateur Extralicensees may operate on these five channels on a secondary basis with a maximum effective radiated power (ERP) of 100 W PEP relative to a half-wave dipole. Permitted operating modes include upper sideband voice (USB), CW, RTTY, PSK31 and other digital modes such as PACTOR III. Only one signal at a time is permitted on any channel.

## 40 Meters ( 7 MHz )



See Sections 97.305(c), 97.307(f)(11) and 97.301(e). These exemptions do not apply to stations in the continental US.


20 Meters (14 MHz)


17 Meters (18 MHz)


15 Meters ( 21 MHz )



## Note:

 W operation is permitted throughout all amateur bands.MCW is authorized above 50.1 MHz , except for 144.0-144.1 and 219-220 MH Test transmissions are authorized above 51 MHz , except for $219-220 \mathrm{MHz}$

| $\square$ | $=$ RTTY and data |
| ---: | :--- |
| $\square$ | $=$ phone and image |
| $\square W W$ | $=$ CW only |
| $\square$ | $=$ SSB phone |
| $\square$ | $=$ USB phone, CW, RTTY, |
| and data |  |
| $=$ | Fixed digital message |
| forwarding systems only |  |

E = Amateur Extra
A = Advanced
G = General
T = Technician
N = Novice
See ARRLWeb at www.arrl.org for detailed band plans.

## ARBL

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