

General License Examination – Memorization Sheet

General Class HF Frequency Privileges

10 meters	28000 – 29700 kHz
12 meters	24890 – 24990 kHz
15 meters	21025 – 21200 kHz and 21275 – 21450 kHz
17 meters	18068 – 18168 kHz
20 meters	14025 – 14150 kHz and 14225 – 14350 kHz (the last digits are 25-50, 25-50)
30 meters	10100 – 10150 kHz (CW and data only)
40 meters	7025 – 7125 kHz and 7175 – 7300 kHz
60 meters	5 authorized channels 2.8kHz wide within US
80 meters	3525 – 3600 kHz and 3800 – 4000 kHz
160 meters	1800 – 2000 kHz

Bolded items are in the question pool

Maximum 1500 watts PEP, **Except** 200 watts PEP on 30 meters, 100 watts for beacons

RTTY/data near center of CW allocation but LSB (170Hz shift for amateur RTTY)

80m data 3570-3600 20m RTTY 14.070-14.100 MHz 20m PSK31 14.070

Maximum Symbol Rate for Packet, RTTY, or Data

Below 10 meters (28 MHz)	300 baud	6m and 2m	19.6 kilobaud
10 meter band	1200 baud	1.25m and 70cm	56 kilobaud

Use General privileges immediately with CSCE, add “/AG” to CW call and “Slant AG” on phone

Minimum Channel Separation

CW 150 – 500Hz SSB 3 kHz

Power Multipliers

20dB = 100 fold change

One S-Unit = 6dB = 4 fold change

3dB = 2 fold change

1dB loss = -20.5%

Data Modes

PSK31 uses varicode

RTTY uses 5 bit Baudot with 170Hz shift

Sideband Operation

Below 14 MHz use lower sideband (LSB)

Above 14 MHz use upper sideband (USB)

Propagation

A-index – Long term geomagnetic stability

K-index – Short term geomagnetic stability

Solar Flux – Radio energy at 10.7cm

D layer absorbs, E layer max single hop ~ 1200 miles, F2 layer max single hop ~2500 miles

Low frequencies good at night (no D layer), higher HF work during day (good F layer charge)

Max range on frequency just below MUF, short range just above LUF

UV and X-rays take 8 minutes to arrive, coronal mass ejections (CMEs) take 20-40 hours

A two tone linearity test uses two **non-harmonically related** audio tones

Q-Signals and Prosigns

QRP – Low power operation, ~ 5 watts on HF

QRV – Ready to receive

QRS – Send more slowly

KN – Listening for specific station(s)

QRQ – Send faster

CL – Closing station

QSL – Acknowledge receipt

AR – End of message

Wire Sizes

15 amp circuit requires 14 gauge wire - 20 amp circuit requires 12 gauge wire

Series/Parallel	Series	Parallel
Resistors/Inductors	Add - $R_1+R_2+R_3...$	Divide - $1/ 1/(R_1+1/R_2+1/R_3...)$
Capacitors	Divide - $1/ 1/(C_1+1/C_2+1/C_3...)$	Add - $C_1+C_2+C_3...$

Reactance

Increases with frequency in a coil, decreases with frequency in a capacitor

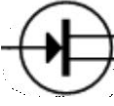
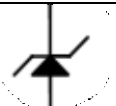
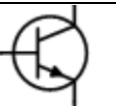

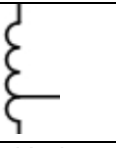
Impedance Matching

Matching impedance between source and load insures **max power transfer/highest efficiency**

Connectors

DE-9	Serial data	PL-259	RF – Good to ~150MHz
DIN	Multiconductor audio/control	N	Waterproof RF – Good to ~10GHz
RCA	Audio	SMA	Small RF – Good to several GHz

Components

				
Field Effect Transistor	Zener Diode	NPN Transistor	Transformer	Tapped Inductor

Germanium Diode Junction Threshold Voltage 0.3 volts

Silicon Diode Junction Threshold Voltage 0.7 volts

Peak Envelope Power

$$PEP = [(0.707PEV)(0.707PEV)]/RL$$

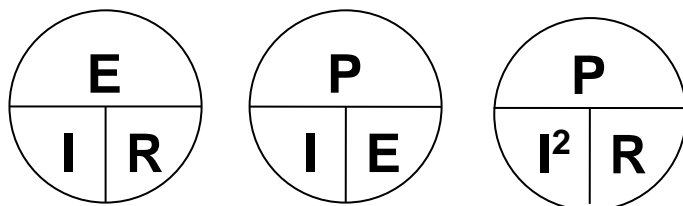
Where: PEV = Peak Voltage

RL = Resistive Load

Peak to Peak voltage= 2(Peak voltage)

RMS = .707(Peak voltage)

Ohm's Law and Power Formulas



E = Voltage in Volts

I = Current in Amperes

R = Resistance in Ohms

P = Power in Watts

Cover the value you need and divide or multiply the remaining values as appropriate

Examples: $P = I \times E$

$P = I^2 \times R$

$P = E^2 / R$

Gates

AND Gate Output is **high** only when **both** inputs high

NOR Gate Output is **low** when **either or both** inputs are high

Antenna Lengths

Dipole Length $L \text{ (Ft)} = \frac{468}{F \text{ (MHz)}}$

$\frac{1}{4}\lambda$ Vertical

$L \text{ (Ft)} = \frac{234}{F \text{ (MHz)}}$

L is Length in Feet and F is Frequency in MHz

Divide Full Wave Loop by **4** for one side of **Quad** Loop
Divide Full Wave Loop by **3** for one side of **Delta** Loop

3 element yagi maximum theoretical gain is 9.7dBi