Chapter 5.5 – Quiz 1 – HF Station Installation

G4C01 - Which of the following might be useful in reducing RF interference to audio frequency circuits?

* A. Bypass inductor
* B. Bypass capacitor
* C. Forward-biased diode
* D. Reverse-biased diode

G4C02 - Which of the following could be a cause of interference covering a wide range of frequencies?

* A. Not using a balun or line isolator to feed balanced antennas
* B. Lack of rectification of the transmitter's signal in power conductors
* C. Arcing at a poor electrical connection
* D. Using a balun to feed an unbalanced antenna

G4C03 - What sound is heard from an audio device experiencing RF interference from a single sideband phone transmitter?

* A. A steady hum whenever the transmitter is on the air
* B. On-and-off humming or clicking
* C. Distorted speech
* D. Clearly audible speech

G4C04 - What sound is heard from an audio device experiencing RF interference from a CW transmitter?

* A. On-and-off humming or clicking
* B. A CW signal at a nearly pure audio frequency
* C. A chirpy CW signal
* D. Severely distorted audio

G4C05 - What is a possible cause of high voltages that produce RF burns?

* A. Flat braid rather than round wire has been used for the ground wire
* B. Insulated wire has been used for the ground wire
* C. The ground rod is resonant
* D. The ground wire has high impedance on that frequency

G4C06 - What is a possible effect of a resonant ground connection?

* A. Overheating of ground straps
* B. Corrosion of the ground rod
* C. High RF voltages on the enclosures of station equipment
* D. A ground loop

G4C08 - Which of the following would reduce RF interference caused by common-mode current on an audio cable?

* A. Place a ferrite choke on the cable
* B. Connect the center conductor to the shield of all cables to short circuit the RFI signal
* C. Ground the center conductor of the audio cable causing the interference
* D. Add an additional insulating jacket to the cable

G4C09 - How can the effects of ground loops be minimized?

* A. Connect all ground conductors in series
* B. Connect the AC neutral conductor to the ground wire
* C. Avoid using lock washers and star washers when making ground connections
* D. Bond equipment enclosures together

G4C10 - What could be a symptom caused by a ground loop in your station's audio connections?

* A. You receive reports of "hum" on your station's transmitted signal
* B. The SWR reading for one or more antennas is suddenly very high
* C. An item of station equipment starts to draw excessive amounts of current
* D. You receive reports of harmonic interference from your station

G4C11 - What technique helps to minimize RF "hot spots" in an amateur station?

* A. Building all equipment in a metal enclosure
* B. Using surge suppressor power outlets
* C. Bonding all equipment enclosures together
* D. Placing low-pass filters on all feed lines

G4C12 - Why must all metal enclosures of station equipment be grounded?

* A. It prevents a blown fuse in the event of an internal short circuit
* B. It prevents signal overload
* C. It ensures that the neutral wire is grounded
* D. It ensures that hazardous voltages cannot appear on the chassis

G4E03 - Which of the following direct, fused power connections would be the best for a 100-watt HF mobile installation?

* A. To the battery using heavy-gauge wire
* B. To the alternator or generator using heavy-gauge wire
* C. To the battery using insulated heavy duty balanced transmission line
* D. To the alternator or generator using insulated heavy duty balanced transmission line

G4E04 - Why should DC power for a 100-watt HF transceiver not be supplied by a vehicle's auxiliary power socket?

* A. The socket is not wired with an RF-shielded power cable
* B. The socket's wiring may be inadequate for the current drawn by the transceiver
* C. The DC polarity of the socket is reversed from the polarity of modern HF transceivers
* D. Drawing more than 50 watts from this socket could cause the engine to overheat

G4E05 - Which of the following most limits an HF mobile installation?

* A. "Picket fencing"
* B. The wire gauge of the DC power line to the transceiver
* C. Efficiency of the electrically short antenna
* D. FCC rules limiting mobile output power on the 75-meter band

G4E07 - Which of the following may cause receive interference to an HF transceiver installed in a vehicle?

* A. The battery charging system
* B. The fuel delivery system
* C. The control computers
* D. All these choices are correct

G6B10 - How does a ferrite bead or core reduce common-mode RF current on the shield of a coaxial cable?

* A. By creating an impedance in the current's path
* B. It converts common-mode current to differential mode current
* C. By creating an out-of-phase current to cancel the common-mode current
* D. Ferrites expel magnetic fields

G8B05 - Which intermodulation products are closest to the original signal frequencies?

* A. Second harmonics
* B. Even-order
* C. Odd-order
* D. Intercept point

G8B12 - What process combines two signals in a non-linear circuit to produce unwanted spurious outputs?

* A. Intermodulation
* B. Heterodyning
* C. Detection
* D. Rolloff

G8B13 - Which of the following is an odd-order intermodulation product of frequencies F1 and F2?

* A. 5F1-3F2
* B. 3F1-F2
* C. 2F1-F2
* D. All these choices are correct

(End of Quiz 1)

Chapter 6.1 and 6.2 – Quiz 2 – Digital Basics, Character-Based Modes

G2E08 - In what segment of the 20-meter band are most digital mode operations commonly found?

* A. At the bottom of the slow-scan TV segment, near 14.230 MHz
* B. At the top of the SSB phone segment, near 14.325 MHz
* C. In the middle of the CW segment, near 14.100 MHz
* D. Between 14.070 MHz and 14.100 MHz

G8A01 - How is direct binary FSK modulation generated?

* A. By keying an FM transmitter with a sub-audible tone
* B. By changing an oscillator's frequency directly with a digital control signal
* C. By using a transceiver's computer data interface protocol to change frequencies
* D. By reconfiguring the CW keying input to act as a tone generator

G8C11 - How are the two separate frequencies of a Frequency Shift Keyed (FSK) signal identified?

* A. Dot and dash
* B. On and off
* C. High and low
* D. Mark and space

G8C16 - Which of the following provide digital voice modes?

* A. WSPR, MFSK16, and EasyPAL
* B. FT8, FT4, and FST4
* C. Winlink, PACTOR II, and PACTOR III
* D. DMR, D-STAR, and SystemFusion

G2E06 - What is the most common frequency shift for RTTY emissions in the amateur HF bands?

* A. 85 Hz
* B. 170 Hz
* C. 425 Hz
* D. 850 Hz

G8A06 - Which of the following is characteristic of QPSK31?

* A. It is sideband sensitive
* B. Its encoding provides error correction
* C. Its bandwidth is approximately the same as BPSK31
* D. All these choices are correct

G8C04 - Which of the following describes Baudot code?

* A. A 7-bit code with start, stop, and parity bits
* B. A code using error detection and correction
* C. A 5-bit code with additional start and stop bits
* D. A code using SELCAL and LISTEN

G8C08 - Which of the following statements is true about PSK31?

* A. Upper case letters are sent with more power
* B. Upper case letters use longer Varicode bit sequences and thus slow down transmission
* C. Error correction is used to ensure accurate message reception
* D. Higher power is needed as compared to RTTY for similar error rates

G8C12 - Which type of code is used for sending characters in a PSK31 signal?

* A. Varicode
* B. Viterbi
* C. Volumetric
* D. Binary

End of Quiz 2

Chapter 6.3 – Quiz 3 – Packet-Based Modes/Systems

G2E02 - What is VARA?

* A. A low signal-to-noise digital mode used for EME (moonbounce)
* B. A digital protocol used with Winlink
* C. A radio direction finding system used on VHF and UHF
* D. A DX spotting system using a network of software defined radios

G2E04 - Which of the following is good practice when choosing a transmitting frequency to answer a station calling CQ using FT8?

* A. Always call on the station's frequency
* B. Call on any frequency in the waterfall except the station's frequency
* C. Find a clear frequency during the same time slot as the calling station
* D. Find a clear frequency during the alternate time slot to the calling station

G2E07 - Which of the following is required when using FT8?

* A. A special hardware modem
* B. Computer time accurate to within approximately 1 second
* C. Receiver attenuator set to -12 dB
* D. A vertically polarized antenna

G2E09 - How do you join a contact between two stations using the PACTOR protocol?

* A. Send broadcast packets containing your call sign while in MONITOR mode
* B. Transmit a steady carrier until the PACTOR protocol times out and disconnects
* C. Joining an existing contact is not possible, PACTOR connections are limited to two stations
* D. Send a NAK code

G2E11 - What is the primary purpose of an Amateur Radio Emergency Data Network (AREDN) mesh network?

* A. To provide FM repeater coverage in remote areas
* B. To provide real time propagation data by monitoring amateur radio transmissions worldwide
* C. To provide high-speed data services during an emergency or community event
* D. To provide DX spotting reports to aid contesters and DXers

G2E12 - Which of the following describes Winlink?

* A. An amateur radio wireless network to send and receive email on the internet
* B. A form of Packet Radio
* C. A wireless network capable of both VHF and HF band operation
* D. All these choices are correct

G2E13 - What is another name for a Winlink Remote Message Server?

* A. Terminal Node Controller
* B. Gateway
* C. RJ-45
* D. Printer/Server

G2E15 - Which of the following is a common location for FT8?

* A. Anywhere in the voice portion of the band
* B. Anywhere in the CW portion of the band
* C. Approximately 14.074 MHz to 14.077 MHz
* D. Approximately 14.110 MHz to 14.113 MHz

G8A09 - What type of modulation is used by FT8?

* A. 8-tone frequency shift keying
* B. Vestigial sideband
* C. Amplitude compressed AM
* D. 8-bit direct sequence spread spectrum

G8A12 - What is QPSK modulation?

* A. Modulation using quasi-parallel to serial conversion to reduce bandwidth
* B. Modulation using quadra-pole sideband keying to generate spread spectrum signals
* C. Modulation using Fast Fourier Transforms to generate frequencies at the first, second, third, and fourth harmonics of the carrier frequency to improve noise immunity
* D. Modulation in which digital data is transmitted using 0-, 90-, 180- and 270-degrees phase shift to represent pairs of bits

G8C02 - Which digital mode is used as a low-power beacon for assessing HF propagation?

* A. WSPR
* B. MFSK16
* C. PSK31
* D. SSB-SC

G8C03 - What part of a packet radio frame contains the routing and handling information?

* A. Directory
* B. Preamble
* C. Header
* D. Trailer

G8C05 - In an ARQ mode, what is meant by a NAK response to a transmitted packet?

* A. Request retransmission of the packet
* B. Packet was received without error
* C. Receiving station connected and ready for transmissions
* D. Entire file received correctly

G8C07 - Which of the following narrow-band digital modes can receive signals with very low signal-to-noise ratios?

* A. MSK144
* B. FT8
* C. AMTOR
* D. MFSK32

G8C09 - Which is true of mesh network microwave nodes?

* A. Having more nodes increases signal strengths
* B. If one node fails, a packet may still reach its target station via an alternate node
* C. Links between two nodes in a network may have different frequencies and bandwidths
* D. More nodes reduce overall microwave out of band interference

G8C10 - How does forward error correction (FEC) allow the receiver to correct data errors?

* A. By controlling transmitter output power for optimum signal strength
* B. By using the Varicode character set
* C. By transmitting redundant information with the data
* D. By using a parity bit with each character

G8C15 - What does an FT8 signal report of +3 mean?

* A. The signal is 3 times the noise level of an equivalent SSB signal
* B. The signal is S3 (weak signals)
* C. The signal-to-noise ratio is equivalent to +3dB in a 2.5 kHz bandwidth
* D. The signal is 3 dB over S9

End of Quiz 3

Chapter 6.4 – Quiz 4 – Rx/Tx Digital Modes

G2E01 - Which mode is normally used when sending RTTY signals via AFSK with an SSB transmitter?

* A. USB
* B. DSB
* C. CW
* D. LSB

G2E05 - What is the standard sideband for JT65, JT9, FT4, or FT8 digital signal when using AFSK?

* A. LSB
* B. USB
* C. DSB
* D. SSB

G2E14 - What could be wrong if you cannot decode an RTTY or other FSK signal even though it is apparently tuned in properly?

* A. The mark and space frequencies may be reversed
* B. You may have selected the wrong baud rate
* C. You may be listening on the wrong sideband
* D. All these choices are correct

G4A11 - Why should the ALC system be inactive when transmitting AFSK data signals?

* A. ALC will invert the modulation of the AFSK mode
* B. The ALC action distorts the signal
* C. When using digital modes, too much ALC activity can cause the transmitter to overheat
* D. All these choices are correct

G8B08 - Why is it important to know the duty cycle of the mode you are using when transmitting?

* A. To aid in tuning your transmitter
* B. Some modes have high duty cycles that could exceed the transmitter's average power rating
* C. To allow time for the other station to break in during a transmission
* D. To prevent overmodulation

G8B10 - What is the relationship between transmitted symbol rate and bandwidth?

* A. Symbol rate and bandwidth are not related
* B. Higher symbol rates require wider bandwidth
* C. Lower symbol rates require wider bandwidth
* D. Bandwidth is half the symbol rate

G8C13 - What is indicated on a waterfall display by one or more vertical lines on either side of a data mode or RTTY signal?

* A. Long path propagation
* B. Backscatter propagation
* C. Insufficient modulation
* D. Overmodulation **(End of Quiz 4)**

Chapter 6.5 – Quiz 5 – Digital Operating Procedures

G1E03 - What is required to conduct communications with a digital station operating under automatic control outside the automatic control band segments?

* A. The station initiating the contact must be under local or remote control
* B. The interrogating transmission must be made by another automatically controlled station
* C. No third-party traffic may be transmitted
* D. The control operator of the interrogating station must hold an Amateur Extra class license

G1E09 - Under what circumstances are messages that are sent via digital modes exempt from Part 97 third-party rules that apply to other modes of communication?

* A. Under no circumstances
* B. When messages are encrypted
* C. When messages are not encrypted
* D. When under automatic control

G1E11 - On what bands may automatically controlled stations transmitting RTTY or data emissions communicate with other automatically controlled digital stations?

* A. On any band segment where digital operation is permitted
* B. Anywhere in the non-phone segments of the 10-meter or shorter wavelength bands
* C. Only in the non-phone Extra Class segments of the bands
* D. Anywhere in the 6-meter or shorter wavelength bands, and in limited segments of some of the HF bands

G2E03 - What symptoms may result from other signals interfering with a PACTOR or VARA transmission?

* A. Frequent retries or timeouts
* B. Long pauses in message transmission
* C. Failure to establish a connection between stations
* D. All these choices are correct

G2E10 - Which of the following is a way to establish contact with a digital messaging system gateway station?

* A. Send an email to the system control operator
* B. Send QRL in Morse code
* C. Respond when the station broadcasts its SSID
* D. Transmit a connect message on the station's published frequency

G8C06 - What action results from a failure to exchange information due to excessive transmission attempts when using an ARQ mode?

* A. The checksum overflows
* B. The connection is dropped
* C. Packets will be routed incorrectly
* D. Encoding reverts to the default character set

G8C14 - Which of the following describes a waterfall display?

* A. Frequency is horizontal, signal strength is vertical, time is intensity
* B. Frequency is vertical, signal strength is intensity, time is horizontal
* C. Frequency is horizontal, signal strength is intensity, time is vertical
* D. Frequency is vertical, signal strength is horizontal, time is intensity

End of Quiz 5