Chapter 4.4 – Quiz 1 – Reactance

G5A02 What is reactance?

* A. Opposition to the flow of direct current caused by resistance
* B. Opposition to the flow of alternating current caused by capacitance or inductance
* C. Reinforcement of the flow of direct current caused by resistance
* D. Reinforcement of the flow of alternating current caused by capacitance or inductance

G5A03 - Which of the following is opposition to the flow of alternating current in an inductor?

* A. Conductance
* B. Reluctance
* C. Admittance
* D. Reactance

G5A04 - Which of the following is opposition to the flow of alternating current in a capacitor?

* A. Conductance
* B. Reluctance
* C. Reactance
* D. Admittance

G5A05 - How does an inductor react to AC?

* A. As the frequency of the applied AC increases, the reactance decreases
* B. As the amplitude of the applied AC increases, the reactance increases
* C. As the amplitude of the applied AC increases, the reactance decreases
* D. As the frequency of the applied AC increases, the reactance increases

G5A06 - How does a capacitor react to AC?

* A. As the frequency of the applied AC increases, the reactance decreases
* B. As the frequency of the applied AC increases, the reactance increases
* C. As the amplitude of the applied AC increases, the reactance increases
* D. As the amplitude of the applied AC increases, the reactance decreases

G5A09 - What unit is used to measure reactance?

* A. Farad
* B. Ohm
* C. Ampere
* D. Siemens

G6A06 - Why should wire-wound resistors not be used in RF circuits?

* A. The resistor's tolerance value would not be adequate
* B. The resistor's inductance could make circuit performance unpredictable
* C. The resistor could overheat
* D. The resistor's internal capacitance would detune the circuit

End of Quiz 1

Chapter 4.4 – Quiz 2 – Impedance and Resonance

G5A01 - What happens when inductive and capacitive reactance are equal in a series LC circuit?

* A. Resonance causes impedance to be very high
* B. Impedance is equal to the geometric mean of the inductance and capacitance
* C. Resonance causes impedance to be very low
* D. Impedance is equal to the arithmetic mean of the inductance and capacitance

G5A07 - What is the term for the inverse of impedance?

* A. Conductance
* B. Susceptance
* C. Reluctance
* D. Admittance

G5A08 What is impedance?

* A. The ratio of current to voltage
* B. The product of current and voltage
* C. The ratio of voltage to current
* D. The product of current and reactance

G5A10 - Which of the following devices can be used for impedance matching at radio frequencies?

* A. A transformer
* B. A Pi-network
* C. A length of transmission line
* D. All these choices are correct

G5A11 - What letter is used to represent reactance?

* A. Z
* B. X
* C. B
* D. Y

G5A12 - What occurs in an LC circuit at resonance?

* A. Current and voltage are equal
* B. Resistance is cancelled
* C. The circuit radiates all its energy in the form of radio waves
* D. Inductive reactance and capacitive reactance cancel

G5C07 - What transformer turns ratio matches an antenna's 600-ohm feed point impedance to a 50-ohm coaxial cable?

* A. 3.5 to 1
* B. 12 to 1
* C. 24 to 1
* D. 144 to 1

G6A11 - What happens when an inductor is operated above its self-resonant frequency?

* A. Its reactance increases
* B. Harmonics are generated
* C. It becomes capacitive
* D. Catastrophic failure is likely

G7C03 - What is one reason to use an impedance matching transformer at a transmitter output?

* A. To minimize transmitter power output
* B. To present the desired impedance to the transmitter and feed line
* C. To reduce power supply ripple
* D. To minimize radiation resistance

End of Quiz 2

Chapter 8.1 – Quiz 3 – The Ionosphere

G2D06 - How is a directional antenna pointed when making a "long-path" contact with another station?

* A. Toward the rising sun
* B. Along the gray line
* C. 180 degrees from the station's short-path heading
* D. Toward the north

G3B01 - What is a characteristic of skywave signals arriving at your location by both short-path and long-path propagation?

* A. Periodic fading approximately every 10 seconds
* B. Signal strength increased by 3 dB
* C. The signal might be cancelled causing severe attenuation
* D. A slightly delayed echo might be heard

G3B09 - What is the approximate maximum distance along the Earth's surface normally covered in one hop using the F2 region?

* A. 180 miles
* B. 1,200 miles
* C. 2,500 miles
* D. 12,000 miles

G3B10 - What is the approximate maximum distance along the Earth's surface normally covered in one hop using the E region?

* A. 180 miles
* B. 1,200 miles
* C. 2,500 miles
* D. 12,000 miles

G3C01 - Which ionospheric region is closest to the surface of Earth?

* A. The D region
* B. The E region
* C. The F1 region
* D. The F2 region

G3C02 - What is meant by the term "critical frequency" at a given incidence angle?

* A. The highest frequency which is refracted back to Earth
* B. The lowest frequency which is refracted back to Earth
* C. The frequency at which the signal-to-noise ratio approaches unity
* D. The frequency at which the signal-to-noise ratio is 6 dB

G3C03 - Why is skip propagation via the F2 region longer than that via the other ionospheric regions?

* A. Because it is the densest
* B. Because of the Doppler effect
* C. Because it is the highest
* D. Because of temperature inversions

G3C04 - What does the term "critical angle" mean, as applied to radio wave propagation?

* A. The long path azimuth of a distant station
* B. The short path azimuth of a distant station
* C. The lowest takeoff angle that will return a radio wave to Earth under specific ionospheric conditions
* D. The highest takeoff angle that will return a radio wave to Earth under specific ionospheric conditions

G3C05 - Why is long-distance communication on the 40-, 60-, 80-, and 160-meter bands more difficult during the day?

* A. The F region absorbs signals at these frequencies during daylight hours
* B. The F region is unstable during daylight hours
* C. The D region absorbs signals at these frequencies during daylight hours
* D. The E region is unstable during daylight hours

G3C11 - Which ionospheric region is the most absorbent of signals below 10 MHz during daylight hours?

* A. The F2 region
* B. The F1 region
* C. The E region
* D. The D region

End of Quiz 3

Chapter 8.2 – Quiz 4 – The Sun

G3A01 - How does a higher sunspot number affect HF propagation?

* A. Higher sunspot numbers generally indicate a greater probability of good propagation at higher frequencies
* B. Lower sunspot numbers generally indicate greater probability of sporadic E propagation
* C. A zero sunspot number indicates that radio propagation is not possible on any band
* D. A zero sunspot number indicates undisturbed conditions

G3A04 - Which of the following are the least reliable bands for long-distance communications during periods of low solar activity?

* A. 80 meters and 160 meters
* B. 60 meters and 40 meters
* C. 30 meters and 20 meters
* D. 15 meters, 12 meters, and 10 meters

G3A05 - What is the solar flux index?

* A. A measure of the highest frequency that is useful for ionospheric propagation between two points on Earth
* B. A count of sunspots that is adjusted for solar emissions
* C. Another name for the American sunspot number
* D. A measure of solar radiation with a wavelength of 10.7 centimeters

G3A07 - At what point in the solar cycle does the 20-meter band usually support worldwide propagation during daylight hours?

* A. At the summer solstice
* B. Only at the maximum point
* C. Only at the minimum point
* D. At any point

G3A10 - What causes HF propagation conditions to vary periodically in a 26- to 28-day cycle?

* A. Long term oscillations in the upper atmosphere
* B. Cyclic variation in Earth's radiation belts
* C. Rotation of the Sun's surface layers around its axis
* D. The position of the Moon in its orbit

G3A12 - What does the K-index measure?

* A. The relative position of sunspots on the surface of the Sun
* B. The short-term stability of Earth's geomagnetic field
* C. The short-term stability of the Sun's magnetic field
* D. The solar radio flux at Boulder, Colorado

G3A13 - What does the A-index measure?

* A. The relative position of sunspots on the surface of the Sun
* B. The amount of polarization of the Sun's electric field
* C. The long-term stability of Earth's geomagnetic field
* D. The solar radio flux at Boulder, Colorado

G3B12 - Which of the following is typical of the lower HF frequencies during the summer?

* A. Poor propagation at any time of day
* B. World-wide propagation during daylight hours
* C. Heavy distortion on signals due to photon absorption
* D. High levels of atmospheric noise or static

G3A02 - What effect does a sudden ionospheric disturbance have on the daytime ionospheric propagation?

* A. It enhances propagation on all HF frequencies
* B. It disrupts signals on lower frequencies more than those on higher frequencies
* C. It disrupts communications via satellite more than direct communications
* D. None, because only areas on the night side of the Earth are affected

G3A03 - Approximately how long does it take the increased ultraviolet and X-ray radiation from a solar flare to affect radio propagation on Earth?

* A. 28 days
* B. 1 to 2 hours
* C. 8 minutes
* D. 20 to 40 hours

G3A06 - What is a geomagnetic storm?

* A. A sudden drop in the solar flux index
* B. A thunderstorm that affects radio propagation
* C. Ripples in the geomagnetic force
* D. A temporary disturbance in Earth's geomagnetic field

G3A08 - How can a geomagnetic storm affect HF propagation?

* A. Improve high-latitude HF propagation
* B. Degrade ground wave propagation
* C. Improve ground wave propagation
* D. Degrade high-latitude HF propagation

G3A09 - How can high geomagnetic activity benefit radio communications?

* A. Creates auroras that can reflect VHF signals
* B. Increases signal strength for HF signals passing through the polar regions
* C. Improve HF long path propagation
* D. Reduce long delayed echoes

G3A11 - How long does it take a coronal mass ejection to affect radio propagation on Earth?

* A. 28 days
* B. 14 days
* C. 4 to 8 minutes
* D. 15 hours to several days

G3A14 - How is long distance radio communication usually affected by the charged particles that reach Earth from solar coronal holes?

* A. HF communication is improved
* B. HF communication is disturbed
* C. VHF/UHF ducting is improved
* D. VHF/UHF ducting is disturbed

G3B02 - What factors affect the MUF?

* A. Path distance and location
* B. Time of day and season
* C. Solar radiation and ionospheric disturbances
* D. All these choices are correct

G3B03 - Which frequency will have the least attenuation for long-distance skip propagation?

* A. Just below the MUF
* B. Just above the LUF
* C. Just below the critical frequency
* D. Just above the critical frequency

G3B04 - Which of the following is a way to determine current propagation on a desired band from your station?

* A. Use a network of automated receiving stations on the internet to see where your transmissions are being received
* B. Check the A-index
* C. Send a series of dots and listen for echoes
* D. All these choices are correct

G3B05 - How does the ionosphere affect radio waves with frequencies below the MUF and above the LUF?

* A. They are refracted back to Earth
* B. They pass through the ionosphere
* C. They are amplified by interaction with the ionosphere
* D. They are refracted and trapped in the ionosphere to circle Earth

G3B06 - What usually happens to radio waves with frequencies below the LUF?

* A. They are refracted back to Earth
* B. They pass through the ionosphere
* C. They are attenuated before reaching the destination
* D. They are refracted and trapped in the ionosphere to circle Earth

G3B07 - What does LUF stand for?

* A. The Lowest Usable Frequency for communications between two specific points
* B. Lowest Usable Frequency for communications to any point outside a 100-mile radius
* C. The Lowest Usable Frequency during a 24-hour period
* D. Lowest Usable Frequency during the past 60 minutes

G3B08 - What does MUF stand for?

* A. The Minimum Usable Frequency for communications between two points
* B. The Maximum Usable Frequency for communications between two points
* C. The Minimum Usable Frequency during a 24-hour period
* D. The Maximum Usable Frequency during a 24-hour period

G3B11 What happens to HF propagation when the LUF exceeds the MUF?

* A. Propagation via ordinary skywave communications is not possible over that path
* B. HF communications over the path are enhanced
* C. Double-hop propagation along the path is more common
* D. Propagation over the path on all HF frequencies is enhanced

End of Quiz 4

Chapter 8.3 – Quiz 5 – Scatter Modes

G3C06 - What is a characteristic of HF scatter?

* A. Phone signals have high intelligibility
* B. Signals have a fluttering sound
* C. There are very large, sudden swings in signal strength
* D. Scatter propagation occurs only at night

G3C07 - What makes HF scatter signals often sound distorted?

* A. The ionospheric region involved is unstable
* B. Ground waves are absorbing much of the signal
* C. The E region is not present
* D. Energy is scattered into the skip zone through several different paths

G3C08 - Why are HF scatter signals in the skip zone usually weak?

* A. Only a small part of the signal energy is scattered into the skip zone
* B. Signals are scattered from the magnetosphere, which is not a good reflector
* C. Propagation is via ground waves, which absorb most of the signal energy
* D. Propagation is via ducts in the F region, which absorb most of the energy

G3C09 - What type of propagation allows signals to be heard in the transmitting station's skip zone?

* A. Faraday rotation
* B. Scatter
* C. Chordal hop
* D. Short-path

G3C10 - What is near vertical incidence skywave (NVIS) propagation?

* A. Propagation near the MUF
* B. Short distance MF or HF propagation at high elevation angles
* C. Long path HF propagation at sunrise and sunset
* D. Double hop propagation near the LUF

End of Quiz 5