

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