B-007-002-008 **(D)**

Why is the F2 region mainly responsible for the longest distance radio-wave propagation?

A Because it exists only at night
B Because it is the lowest ionospheric region
C Because it does not absorb radio waves as much as other ionospheric regions
D Because it is the highest ionospheric region

B-007-002-009 **(D)**

What is the main reason the 160, 80 and 40 metre amateur bands tend to be useful only for short-distance communications during daylight hours?

A Because of auroral propagation
B Because of magnetic flux
C Because of a lack of activity
D Because of D-region absorption

B-007-002-010 **(D)**

During the day, one of the ionospheric layers splits into two parts called:

A D1 and D2
B E1 and E2
C A and B
D F1 and F2

B-007-002-011 **(C)**

The position of the E layer in the ionosphere is:

A sporadic
B above the F layer
C below the F layer
D below the D layer

B-007-003-001 **(B)**

What is a skip zone?

A An area covered by ground-wave propagation
B An area which is too far away for ground-wave propagation, but too close for sky-wave propagation
C An area which is too far away for ground-wave or sky-wave propagation
D An area covered by sky-wave propagation

B-007-003-002 **(A)**

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

A 4000 km (2500 miles)
B None, the F2 region does not support radio-wave propagation
C 2000 km (1250 miles)
D 300 km (190 miles)

B-007-003-003 **(D)**

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

A 300 km (190 miles)
B 4000 km (2500 miles)
C None, the E region does not support radio-wave propagation
D 2000 km (1250 miles)

B-007-003-004 **(A)**

Skip zone is:

A a zone between the end of the ground wave and the point where the first refracted wave returns to Earth
B a zone of silence caused by lost sky waves
C a zone between any two refracted waves
D a zone between the antenna and the return of the first refracted wave

B-007-003-005 **(C)**

The distance to Europe from your location is approximately 5000 km. What sort of propagation is the most likely to be involved?

A Back scatter
B Tropospheric scatter
C Multihop
D Sporadic "E"

B-007-003-006 **(C)**

For radio signals, the skip distance is determined by the:

A angle of radiation
B type of transmitting antenna used
C height of the ionosphere and the angle of radiation
D power fed to the power amplifier

B-007-003-007 **(A)**

The distance from the transmitter to the nearest point where the sky wave returns to the Earth is called the:

A skip distance
B skip zone
C angle of radiation
D maximum usable frequency

B-007-003-008 **(D)**

Skip distance is the:

A the maximum distance reached by a signal after one reflection by the ionosphere
B the minimum distance reached by a ground-wave signal
C the maximum distance a signal will travel by both a ground wave and reflected wave
D the minimum distance reached by a signal after one reflection by the ionosphere

B-007-003-009 **(C)**

Skip distance is a term associated with signals from the ionosphere. Skip effects are due to:

A high gain antennas being used
B local cloud cover
C reflection and refraction from the ionosphere
D selective fading of local signals

B-007-003-010 **(B)**

The skip distance of a sky wave will be greatest when the:

A signal given out is strongest
B angle between the ground and the radiation is smallest
C polarization is vertical
D ionosphere is most densely ionized

B-007-003-011 **(B)**

If the height of the reflecting layer of the ionosphere increases, the skip distance of a high frequency (HF) transmission:

A decreases
B becomes greater
C stays the same
D varies regularly

B-007-004-001 **(A)**

What effect does the D region of the ionosphere have on lower frequency HF signals in the daytime?

A It absorbs the signals
B It bends the radio waves out into space
C It refracts the radio waves back to Earth
D It has little or no effect on 80-metre radio waves

B-007-004-002 **(A)**

What causes distant AM broadcast and 160 metre ham band stations not to be heard during daytime hours?

A The ionization of the D region
B The presence of ionized clouds in the E region
C The splitting of the F region
D The weather below the ionosphere

B-007-004-003 **(C)**

Two or more parts of the radio wave follow different paths during propagation and this may result in phase differences at the receiver. This "change" at the receiver is called:

A absorption
B skip
C fading
D baffling

B-007-004-004 **(B)**

A change or variation in signal strength at the antenna, caused by differences in path lengths, is called:

A path loss
B fading
C absorption
D fluctuation

B-007-004-005 **(A)**

When a transmitted radio signal reaches a station by a one-hop and two-hop skip path, small changes in the ionosphere can cause:

A variations in signal strength
B consistent fading of received signal
C consistently stronger signals
D a change in the ground-wave signal

B-007-004-006 **(B)**

The usual effect of ionospheric storms is to:

A increase the maximum usable frequency
B cause a fade-out of sky-wave signals
C produce extreme weather changes
D prevent communications by ground wave

B-007-004-007 **(D)**

On the VHF and UHF bands, polarization of the receiving antenna is very important in relation to the transmitting antenna, yet on HF bands it is relatively unimportant. Why is that so?

A The ground wave and the sky wave continually shift the polarization
B Anomalies in the Earth's magnetic field produce a profound effect on HF polarization but not on VHF & UHF frequencies
C Greater selectivity is possible with HF receivers making changes in polarization redundant
D The ionosphere can change the polarization of the signal from moment to moment

B-007-004-008 **(A)**

What causes selective fading?

A Phase differences between radio wave components of the same transmission, as experienced at the receiving station
B Small changes in beam heading at the receiving station
C Time differences between the receiving and transmitting stations
D Large changes in the height of the ionosphere at the receiving station ordinarily occurring shortly before sunrise and sunset

B-007-004-009 **(D)**

How does the bandwidth of a transmitted signal affect selective fading?

A It is the same for both wide and narrow bandwidths
B Only the receiver bandwidth determines the selective fading effect
C It is more pronounced at narrow bandwidths
D It is more pronounced at wide bandwidths

B-007-004-010 **(A)**

Polarization change often takes place on radio waves that are propagated over long distances. Which of these does not cause polarization change?

A Parabolic interaction
B Reflections
C Passage through magnetic fields (Faraday rotation)
D Refractions

B-007-004-011 **(B)**

Reflection of a SSB transmission from the ionosphere causes:

A a high-pitch squeal at the receiver
B little or no phase-shift distortion
C phase-shift distortion
D signal cancellation at the receiver

B-007-005-001 **(D)**

How do sunspots change the ionization of the atmosphere?

A The more sunspots there are, the less the ionization
B Unless there are sunspots, the ionization is zero
C They have no effect
D The more sunspots there are, the greater the ionization

B-007-005-002 **(C)**

How long is an average sunspot cycle?

A 5 years
B 7 years
C 11 years
D 17 years

B-007-005-003 **(B)**

What is solar flux?

A The density of the sun's magnetic field
B The radio energy emitted by the sun
C A measure of the tilt of the Earth's ionosphere on the side toward the sun
D The number of sunspots on the side of the sun facing the Earth

B-007-005-004 **(C)**

What is the solar-flux index?

A A measure of solar activity that compares daily readings with results from the last six months
B A measure of solar activity that is taken annually
C A measure of solar activity that is taken at a specific frequency
D Another name for the American sunspot number

B-007-005-005 **(D)**

What influences all radiocommunication beyond ground-wave or line-of-sight ranges?

A The F2 region of the ionosphere
B The F1 region of the ionosphere
C Lunar tidal effects
D Solar radiation

B-007-005-006 **(D)**

Which two types of radiation from the sun influence propagation?

A Subaudible and audio-frequency emissions
B Polar region and equatorial emissions
C Infrared and gamma-ray emissions
D Electromagnetic and particle emissions

B-007-005-007 **(B)**

When sunspot numbers are high, how is propagation affected?

A High frequency radio signals become weak and distorted
B Frequencies up to 40 MHz or even higher become usable for long-distance communication
C High frequency radio signals are absorbed
D Frequencies up to 100 MHz or higher are normally usable for long-distance communication

B-007-005-008 **(D)**

All communication frequencies throughout the spectrum are affected in varying degrees by the:

A ionosphere
B aurora borealis
C atmospheric conditions
D sun

B-007-005-009 **(C)**

Average duration of a solar cycle is:

A 6 years
B 1 year
C 11 years
D 3 years

B-007-005-010 **(C)**

The ability of the ionosphere to reflect high frequency radio signals depends on:

A the receiver sensitivity
B upper atmosphere weather conditions
C the amount of solar radiation
D the power of the transmitted signal

B-007-005-011 **(C)**

HF radio propagation cycles have a period of approximately 11:

A days
B centuries
C years
D months

B-007-006-001 **(D)**

What happens to signals higher in frequency than the critical frequency?

A They are absorbed by the ionosphere
B Their frequency is changed by the ionosphere to be below the maximum usable frequency
C They are reflected back to their source
D They pass through the ionosphere

B-007-006-002 **(A)**

What causes the maximum usable frequency to vary?

A The amount of radiation received from the sun, mainly ultraviolet
B The temperature of the ionosphere
C The speed of the winds in the upper atmosphere
D The type of weather just below the ionosphere

B-007-006-003 **(A)**

What does maximum usable frequency mean?

A The highest frequency signal that will reach its intended destination
B The lowest frequency signal that will reach its intended destination
C The highest frequency signal that is most absorbed by the ionosphere
D The lowest frequency signal that is most absorbed by the ionosphere

B-007-006-004 **(C)**

What can be done at an amateur station to continue HF communications during a sudden ionospheric disturbance?

A Try a different antenna polarization
B Try a different frequency shift
C Try a higher frequency band
D Try the other sideband

B-007-006-005 **(D)**

What is one way to determine if the maximum usable frequency (MUF) is high enough to support 28 MHz propagation between your station and western Europe?

A Listen for signals from 20-metre beacon stations
B Listen for signals from 39-metre broadcast stations
C Listen for WWVH time signals on 20 MHz
D Listen for signals from 10-metre beacon stations

B-007-006-006 **(A)**

What usually happens to radio waves with frequencies below the maximum usable frequency (MUF) when they are sent into the ionosphere?

A They are bent back to the Earth
B They are changed to a frequency above the MUF
C They are completely absorbed by the ionosphere
D They pass through the ionosphere

B-007-006-007 **(D)**

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

A Only at the minimum point of the solar cycle
B Only at the maximum point of the solar cycle
C At the summer solstice
D At any point in the solar cycle

B-007-006-008 **(C)**

If we transmit a signal, the frequency of which is so high we no longer receive a reflection from the ionosphere, the signal frequency is above the:

A speed of light
B sunspot frequency
C maximum usable frequency
D skip distance

B-007-006-009 **(B)**

Communication on the 80 metre band is generally most difficult during:

A daytime in winter
B daytime in summer
C evening in winter
D evening in summer

B-007-006-010 **(A)**

The optimum working frequency provides the best long range HF communication. Compared with the maximum usable frequency (MUF), it is usually:

A slightly lower
B double the MUF
C half the MUF
D slightly higher

B-007-006-011 **(A)**

During summer daytime, which bands are the most difficult for communications beyond ground wave?

A 160 and 80 metres
B 40 metres
C 30 metres
D 20 metres

B-007-007-001 **(A)**

Which ionospheric region most affects sky-wave propagation on the 6 metre band?

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

B-007-007-002 **(C)**

What effect does tropospheric bending have on 2-metre radio waves?

A It garbles the signal
B It reverses the sideband of the signal
C It lets you contact stations farther away
D It causes them to travel shorter distances

B-007-007-003 **(A)**

What causes tropospheric ducting of radio waves?

A A temperature inversion
B Lightning between the transmitting and receiving stations
C An aurora to the north
D A very low pressure area

B-007-007-004 **(A)**

That portion of the radiation kept close to the Earth's surface due to bending in the atmosphere is called the:

A tropospheric wave
B inverted wave
C ground wave
D ionospheric wave

B-007-007-005 **(A)**

What is a sporadic-E condition?

A Patches of dense ionization at E-region height
B Partial tropospheric ducting at E-region height
C Variations in E-region height caused by sunspot variations
D A brief decrease in VHF signals caused by sunspot variations

B-007-007-006 **(D)**

On which amateur frequency band is the extended-distance propagation effect of sporadic-E most often observed?

A 160 metres
B 20 metres
C 2 metres
D 6 metres

B-007-007-007 **(A)**

In the northern hemisphere, in which direction should a directional antenna be pointed to take maximum advantage of auroral propagation?

A North
B East
C West
D South

B-007-007-008 **(B)**

Where in the ionosphere does auroral activity occur?

A At D-region height
B At E-region height
C At F-region height
D In the equatorial band

B-007-007-009 **(A)**

Which emission mode is best for auroral propagation?

A CW
B RTTY
C FM
D SSB

B-007-007-010 **(B)**

Excluding enhanced propagation modes, what is the approximate range of normal VHF tropospheric propagation?

A 1600 km (1000 miles)
B 800 km (500 miles)
C 2400 km (1500 miles)
D 3200 km (2000 miles)

B-007-007-011 **(C)**

What effect is responsible for propagating a VHF signal over 800 km (500 miles)?

A D-region absorption
B Moon bounce (EME) Earth - Moon - Earth
C Tropospheric ducting
D Faraday rotation

B-007-008-001 **(D)**

What kind of unusual HF propagation allows weak signals from the skip zone to be heard occasionally?

A Sky-wave with low radiation angle
B Ducting
C Ground-wave
D Scatter-mode

B-007-008-002 **(A)**

If you receive a weak, distorted signal from a distance, and close to the maximum usable frequency, what type of propagation is probably occurring?

A Scatter
B Ground-wave
C Line-of-sight
D Ducting

B-007-008-003 **(C)**

What is a characteristic of HF scatter signals?

A Reversed sidebands
B High intelligibility
C Rapid flutter or hollow sounding distortion
D Reversed modulation

B-007-008-004 **(B)**

What makes HF scatter signals often sound distorted?

A The state of the E-region at the point of refraction
B Energy scattered into the skip zone through several radio-wave paths
C Auroral activity and changes in the Earth's magnetic field
D Propagation through ground waves that absorb much of the signal

B-007-008-005 **(B)**

Why are HF scatter signals usually weak?

A Auroral activity absorbs most of the signal energy
B Only a small part of the signal energy is scattered into the skip zone
C Propagation through ground waves absorbs most of the signal energy
D The F region of the ionosphere absorbs most of the signal energy

B-007-008-006 **(C)**

What type of propagation may allow a weak signal to be heard at a distance too far for ground-wave propagation but too near for normal sky-wave propagation?

A Sporadic-E skip
B Ground wave
C Scatter
D Short-path skip

B-007-008-007 **(C)**

On the HF bands, when is scatter propagation most likely involved?

A At night
B When the F1 and F2 regions are combined
C When weak and distorted signals near or above the maximum usable frequency for normal propagation can be heard over unusual paths
D When the sunspot cycle is at a minimum and D-region absorption is high