



Chapter 6 - Answers

Q1 What is propagation?

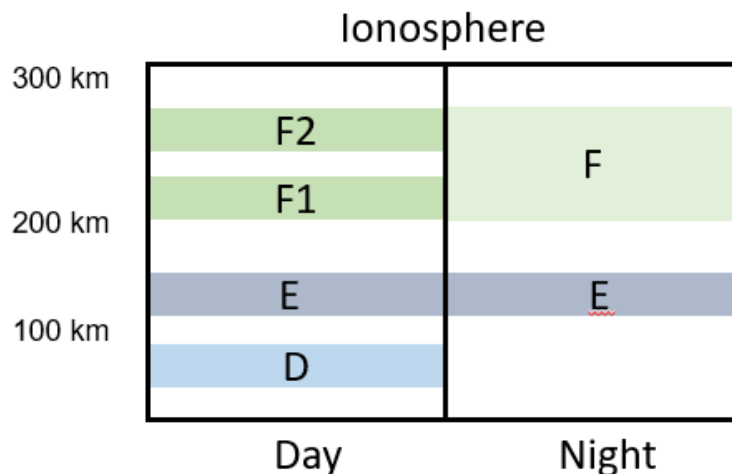
Propagation is defined as the movement of radio waves from a transmitter to a receiver.

Q2 What is a direct wave?

Direct wave or line of sight wave travel in a straight line from the transmitting antenna to the receiving antenna.

Q3 The ionosphere reduces to two main layers at night, what are these layers?

E and F layer



Q4 What is the MUF?

Maximum useable frequency. The Critical Frequency is tested vertically. Signals transmitted around the world are not aimed vertically but at an angle to the earth or at low angles of incidence. These sky waves can propagate over great distances. The maximum usable frequency (MUF) is the maximum frequency you can use at that time to achieve the skip. Frequencies above the MUF will go through the ionosphere and is lost.

Q5 Are HF communications better or worse when there is high sunspot activity and explain your answer?

Sunspots will increase during the “solar maximum” and decrease near the “solar minimum.” Below is a chart copied from the Bureau of Meteorology site and shows the sunspot activity is approaching a peak.

The higher HF bands will be more successful with skip propagation during the years near solar maximum. Some of these higher HF bands may not open during the lower activity portions of the solar cycle.

Q6 What is line of sight (LOS) communications.?

Radio waves travelling in a straight line from the transmitting antenna to the receiving antenna.

Q7 What frequency bands would be used for LOS communications?

LOS communications use UHF, VHF, SHF and EHF frequencies.

Q8 How do ground waves propagate?

Ground waves follow the contour of the Earth.

Q9 What is tropospheric ducting?

The troposphere temperature inversion layer creates a duct which radio waves can travel along.

Q10 Name two other forms of propagation.

Troposcatter, meteor scatter, auroral scatter, EME and ionospheric.

Q11 Explain skip zone and skip distance.

Skip distance between station A and station B

Skip zone distance is where ground wave ends and station B.

Q12 What is diffraction?

Diffraction is the bending of signals around edges of geometric objects.

Q13 What is refraction?

Refraction is the bending of radio waves as they pass through atmospheric layers.

Q14 What is reflection?

Reflection is where the signal is reflected from the ionosphere like a mirror.

Q15 What is the Critical Frequency (CF)?

Critical Frequency (CF) - CF is obtained by sending a signal pulse directly upwards (vertically) and received back at the same site. As the frequency is increased, a point is reached where the signal will pass through the layer and this is the critical frequency.

Q16 What is fading?

Fading is a common feature as the ionosphere changes, the signals will fall in and out of phase with one another, resulting in the strength varying by a considerable degree.

Q17 What is the signal to noise ratio?

Signal to Noise Ratio (SNR) - SNR compares the level of a desired signal to the level of background noise measured in decibels. A ratio higher than 1:1 (greater than 0 dB) indicates more signal than noise. A suggested minimum SNR is 20dB.