End of Chapter 14 Exercises

Q1) A waveform travels in space at a rate of approximately 300 million meters per second. The wavelength of sine wave is the actual distance in space that is used by one sine wave as it travels. What is the wavelength of a 100-MHz sine wave? What is the wavelength of a 500-MHz sine wave? Antenna to send and receive electromagnetic waves are often sized to be one-half of the wavelength for the particular wave being used. Compare your previous calculations to the size of VHF and UHF television antennas. How large would be a ½ wavelength antenna have to be to transmit a 60-Hz wave?

Ans)

The wavelength of a 100-MHz sine wave is 3 meters, half wavelength is 1.5m length.

The wavelength of 500-MHz sine wave is 0.6 meters. Half wavelength is 0.3m length.

For a 60Hz wave we require an antenna of 5x106 meters so the half wavelength is 2.5 x 106 meters or 2500KM.