



[Visit Suncam.com for more courses](http://www.suncam.com)

Continuing Education Course #014  
Introduction to Antennas

1. The property of antennas that states that the transmission and reception patterns are the same is called:
  - a. Symmetry
  - b. Reciprocity
  - c. Conservation of energy
  - d. Transitivity
  
2. The wavelength of an electromagnetic wave is defined as
  - a. How far the wave travels through space during one complete cycle
  - b. How far the wave can travel through space
  - c. The speed of light divided by the distance traveled
  - d. The frequency divided by the speed of propagation
  
3. What is the approximate wavelength of a 30 MHz signal in free space?
  - a. 100 m
  - b. 30 m
  - c. 10 m
  - d. 3 m
  
4. Directivity is defined as the ratio of \_\_\_\_\_ at a given distance in the direction of maximum intensity to the \_\_\_\_\_ at the same distance.
  - a. Peak amplitude, average amplitude
  - b. Radiated power density, average power density
  - c. Gain, average gain
  - d. Peak power, minimum power
  
5. The effective area of an aperture antenna is defined as
  - a. The area that is perpendicular to the direction of radiation/reception
  - b. The product of the effective height and the effective width of the antenna
  - c. The physical area of the aperture times the aperture efficiency
  - d. The portion of the antenna aperture area that actually radiates or receives
  
6. If an antenna has a gain of 3 dBi, what is the gain when expressed relative to a dipole (i.e. in dBd)?
  - a. 3.0 dBd
  - b. 5.14 dBd
  - c. 2.14 dBd
  - d. 0.86 dBd
  
7. What is the approximate gain of an antenna that has a 3 degree elevation beamwidth and 8 degree azimuth beamwidth?

- a. 10 dBi
- b. 20 dBi
- c. 25.2 dBi
- d. 30.3 dBi

8. What is the gain of a rectangular aperture antenna that is 1 m by 2 m? Assume a 65% overall aperture efficiency and it is operated at 10 GHz.

- a. 18.6 dBi
- b. 27.4 dB
- c. 42.6 dBi
- d. 49.1 dB

9. What is the relative level of the first sidelobe of an aperture antenna that uses a raised cosine ( $n=1$ ) illumination taper?

- a. -13.2 dB
- b. -17 dB
- c. -23 dB
- d. -32 dB

10. What is the VSWR when a 100 ohm antenna is connected to a 50 ohm source?

- a. 1
- b. 2
- c. 3
- d. 4

11. What is the reflection coefficient for a 100 ohm antenna driven by a 50 ohm source?

- a. 0
- b. 1
- c. 3
- d. 1/3

12. What is the VSWR loss for a 100 ohm antenna driven by a 50 ohm source?

- a. 0 dB
- b. 0.5 dB
- c. 1 dB
- d. 1.2 dB

13. The transition region of the antenna pattern is defined as:

- a. The region where the magnetic field transitions to an electric field
- b. The region where the magnetic and electric fields are nearly perpendicular
- c. The region between the near-field boundary and the far-field boundary
- d. The region where the antenna currents transition to free space

14. The far-field region of an antenna is defined as:

- a. The region where the electric and magnetic fields are essentially perpendicular
- b. The region where coupling is negligible
- c. The region beyond the near field
- d. The sidelobe region of the antenna pattern

15. How far away from a 1 meter diameter dish does the far-field region start if the antenna is operated at 6 GHz?

- a. 40 m
- b. 20 m
- c. 10 m
- d. 1 m

16. What is the distance to the outer edge of the near-field boundary on a 7m antenna operating at 4 MHz?

- a. 0.08 m
- b. 1.1 m
- c. 5.2 m
- d. 11.9 m

17. Antenna polarization is defined as:

- a. Orientation of the plane that contains the electric field of the radiated wave
- b. The orientation of the plane that contains the magnetic field of the radiated wave
- c. The orientation of the cross product of the magnetic field and the electric field
- d. The orientation of the largest dimension of the antenna

18. What is the definition of the polarization loss factor?

- a. The amount of polarization that is lost in transition from the antenna to free space
- b. The reduction in axial ratio relative to the ideal
- c. The portion of incident power that is coupled to the receive antenna
- d. The percentage of applied power that is actually transmitted from the antenna

19. If the polarization loss factor of an RF link (a transmit and receive antenna combination) is -3 dB, what is the cross-polarization isolation, using the expression for XPD on Page 27?

- a. 0 dB
- b. 3 dB
- c. 10 dB
- d. 12 dB

20. What is the polarization loss factor for a circularly polarized wave with an axial ratio of 2 dB being received by a linearly polarized antenna?

Hint: The linearly polarized antenna can be well approximated as a circularly polarized antenna with a large axial ratio (60 dB) when using Figure 13.

- a. 4.2 dB
- b. 2 dB
- c. 3 dB
- d. 3.6 dB

[Purchase this course on Suncam.com](http://Suncam.com)