

### KNOWLEDGE PROBE 3: INTRODUCTION TO WIRELESS TECHNOLOGY

#### Propagation of Radio Waves

#### Learning Objectives

1. Distinguish between the types of radio wave propagation.
  2. Distinguish between reflection, refraction, and diffraction.
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1. Which of the following condition(s) must exist in order for a radio wave to be reflected?
    - a. There must be a large surface area
    - b. The object must be a conductor
    - c. Both of the above
    - d. None of the above
  2. Radio waves will pass through non-conducting walls and objects.
    - a. True
    - b. False
  3. Refraction is the
    - a. Absorption of a wave
    - b. Bending of a wave
    - c. Same as reflection
    - d. Scattering of a wave
  4. What mode of propagation relies on refraction?
    - a. Ground wave
    - b. Microwaves
    - c. Sky wave
    - d. Space wave
  5. What frequency range of signals relies on ground waves?
    - a. Above 1 GHz
    - b. Above 3 MHz
    - c. Below 3 MHz
    - d. From the 3 to 30 MHz range
  6. What is the main benefit of sky waves?
    - a. Improved reliability of communications
    - b. Increased security of communications
    - c. Long distance communications
    - d. Lower equipment costs



7. What causes refraction of radio waves?
  - a. Atmosphere
  - b. Ionosphere
  - c. Meteor showers
  - d. Pollution
  
8. Line of sight (LOS) communications means that
  - a. Reflected signals are OK
  - b. Refracted signals work fine
  - c. There should be no objects between the transmitting and receiving antennas
  - d. Transmitting and receiving antennas must “see” one another
  
9. Radio waves with frequencies above about 50 MHz pass through the ionosphere.
  - a. True
  - b. False
  
10. What is the distance to the horizon for a radio wave radiated from an antenna tower 300 feet high?
  - a. 17.3 miles
  - b. 24.5 miles
  - c. 33.6 miles
  - d. 47.2 miles