
CHAPTER 7

Transmission Media

Review Questions

1. The transmission media is a separate entity located beneath the physical layer and controlled by the physical layer.
2. Guided and unguided media
3. Guided media have physical boundaries, while unguided media are unbounded.
4. Twisted-pair, coaxial, and fiber-optic cable
5. In twisted-pair cable and coaxial cable, the signal is in the form of an electric current. In fiber-optic cable the signal is in the form of light.
6. Twisted pair: telephone lines
Coaxial cable: cable TV networks
Fiber-optic cable: backbone networks
7. STP has a metal casing that prevents the penetration of electromagnetic noise.
8. Twisting ensures that both wires are equally, but inversely, affected by external influences such as noise.
9. Coaxial cable can carry higher frequencies than twisted pair cable and is less susceptible to noise.
10. Reflection is the phenomenon that occurs when a beam of light travels into a less dense medium and the angle of incidence is greater than the critical angle. The beam changes direction at the interface and goes back into the more dense medium.
11. In multimode, multiple beams of light from one source travel through the core in different paths. In graded-index multimode, the core's density is not constant but is higher in the center and decreases gradually to a lower density at the edge. In single mode, a step-index fiber is used with a highly focused source of light.
12. The inner core of an optical fiber is surrounded by cladding. The core is denser than the cladding, so a light beam traveling through the core is reflected at the boundary between the core and the cladding if the incident angle is more than the critical angle.

13. Noise resistance, less signal attenuation, and higher bandwidth
14. Fiber optic cabling is expensive, installation/maintenance is difficult, and is fragile
15. Ground propagation, sky propagation, and line-of-sight propagation.
16. Radio waves: AM radio
Microwaves: cellular phones
Infrared waves: communication between a wireless mouse and the computer
17. In sky propagation radio waves radiate upward into the ionosphere and are then reflected back to earth. In line-of-sight propagation signals are transmitted in a straight line from antenna to antenna.
18. Omnidirectional waves are propagated in all directions; unidirectional waves are propagated in one direction.
19. An IrDA port allows a wireless keyboard to communicate with a PC through infrared waves.

Multiple-Choice Questions

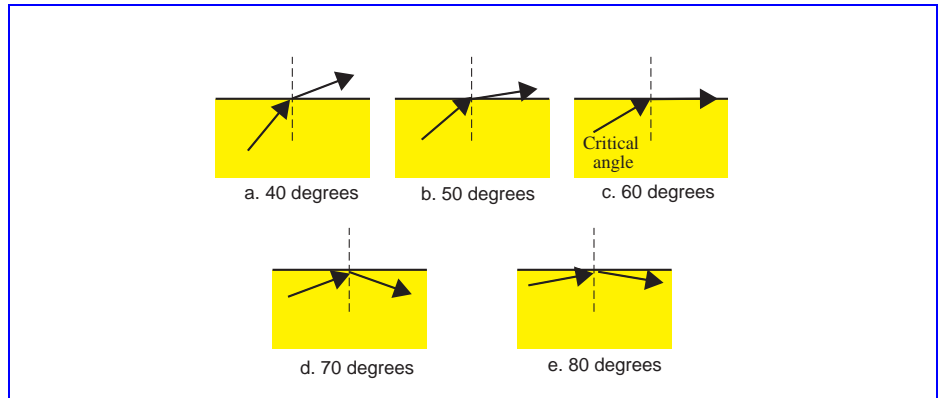
20. b
21. a
22. d
23. c
24. b
25. a
26. b
27. b
28. d
29. c
30. c
31. b
32. a
33. a
34. c
35. a
36. c
37. d
38. a
39. b
40. c
41. c
42. a
43. a
44. c

45. a

Exercises

46. See Figure 7.1.

Figure 7.1 Exercise 46



47. $\text{dB} = 10 \log_{10} (90 / 100) = -0.46 \text{ dB}$

48. As the bandwidth increases, the effective distance decreases (due to increase in attenuation).

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50. No.

51. $6.67 \times 10^{13} \text{ Hz}$

