Chapter 35 Even Answers

2. 227 Mm/s

4. (a) See solution (b) 300 Mm/s

6. (a) 4.74×10^{14} Hz (b) 422 nm (c) 200 Mm/s

8. (a) 1.52 (b) 417 nm

(c) 4.74×10^{14} Hz (d) 198 Mm/s

10. 158 Mm/s

12. (a) 327 nm (b) 287 nm

14. (a) 1.94 m (b) 50.0° above horizontal

16. 0.388 cm

18. $\theta = 30.4°,\ \theta' = 22.3°$

20. $\sim 10^{-11}$ s, $\sim 10^{3}$ wavelengths

24. (a) $\frac{h}{c}\left(\frac{n+1.00}{2}\right)$ (b) $\left(\frac{n+1.00}{2}\right)$ times longer

26. 30.0° and 19.5° at entry, 40.5° and 77.1° at exit

28. (a) 41.5° (b) 18.5°

(c) 27.6° (d) 42.6°

32. $\sin^{-1}\left(n\sin\left[\Phi - \sin^{-1}\left(\frac{1.00}{n}\right)\right]\right)$, or $\sin^{-1}\left(\sqrt{n^2-1}\sin\Phi - \cos\Phi\right)$

34. (a) See solution (b) 37.2°

(c) 37.3° (d) 37.3°

36. (a) 33.4° (b) 53.4° (c) there is no critical angle

38. 67.2°

40. 1.41

42. (a) 10.7° (b) air

(c) Sound in air falling on the wall from most directions is 100% reflected.

44. 54.8° east of north

46. (a) $\theta_1' = 30.0°,\ \theta_2 = 18.8°$ (b) $\theta_1' = 30.0°,\ \theta_2 = 50.8°$

(c) See solution (d) See solution

50. 67.4°

52. 0.359 mm

56. (a) 0.0426 or 4.26% (b) no difference

(c) $1 - 2.27 \times 10^{-7}$, almost 100%. This suggests that the condensate would be very shiny, reflecting practically all incident light.

58. 70.6%

60. 3.79 m

62. 36.5°

64. $\sin^{-1}\left[\frac{L}{R^2}\left(\sqrt{n^2R^2 - L^2} - \sqrt{R^2 - L^2}\right)\right]$

66. 1.93

68. 7.96°

70. See solution. $n = \text{slope} = 1.328 \pm 0.8\%$