Chapter 18 Even Answers

2. $y_2 = (0.0800\text{ m})\sin[2\pi(0.100x - 80.0t + 0.167)]$

4. 0.500 s

6. (a) $\Delta r = \lambda/2$ (b) $9.00x^2 - 16.0y^2 = 144$

8. (a) number of minima = greatest integer $\leq d(f/v) + \dfrac{1}{2}$

(b) $L_n = \dfrac{d^2 - (n - 1/2)^2(v/f)^2}{2(n - 1/2)(v/f)}$ where $n = 1, 2, 3, \ldots$, number of minima

10. (a) $x = (2n + 1)\pi$ m (b) 0.0294 m

14. (a) 2.00 cm (b) 2.40 cm

16. 5.00 Hz, 10.0 Hz, 15.0 Hz, the fifth mode at 25.0 Hz

18. (a) 0.600 m (b) 30.0 Hz

20. (a) reduced by $1/2$ (b) reduced by $1/\sqrt{2}$ (c) increased by $\sqrt{2}$

22. 800 Hz

24. $\dfrac{Mg}{4Lf^2\tan\theta}$

26. 1.27 cm

28. 9.00 kHz

30. The 12 hr 24 min period of free oscillation agrees precisely with the period of the lunar exicitation.

32. $n(0.252\text{ m})$ with $n = 1, 2, 3, \ldots$

34. 0.656 m and 1.64 m

36. 20.5 kg

38. (a) 162 Hz (b) 1.06 m

40. $\dfrac{\pi r^2 v}{2Rf}$

42. 21.5 m

44. (a) 17.0 Hz (b) 34.0 Hz (c) 17.6 Hz, 35.2 Hz

46. 1.16 m

48. 1.88 kHz

50. (a) 521 Hz or 525 Hz (b) 526 Hz (c) reduced by 1.14%

52. See Instructor's Manual

54. (a) $\dfrac{1}{2}Mg$ (b) $3h$ (c) $\dfrac{m}{3h}$ (d) $\sqrt{\dfrac{3Mgh}{2m}}$ (e) $\sqrt{\dfrac{3Mg}{8mh}}$

(f) $\sqrt{\dfrac{2mh}{3Mg}}$ (g) h (h) $(2.00 \times 10^{-2})\sqrt{\dfrac{3Mg}{8mh}}$

56. (a) 34.8 m/s (b) 0.977 m

58. 3.99 Hz

60. 4.85 m

62. (a) 30:24:20:15 (b) 33.5, 26.8, 22.3, 16.7 cm (c) 256, 320, 384, 512 Hz

64. 0.111

66. (a) 45.0 or 55.0 Hz (b) 162 or 242 N

68. $y_1 + y_2 = 11.2\sin(2.00x - 10.0t + 63.4°)$

70. (a) 78.9 N (b) 211 Hz