Chapter 16 Even Answers

2. See Instructor's Manual.
4. See Instructor's Manual.
6. 184 km
8. (a) –1.65 (b) –6.02 (c) 1.15
10. 80.0 N
12. 520 m / s
14. 631 N
16. $\frac{Tg}{2\pi}\sqrt{\frac{M}{m}}$
18. (a) $v = \left(30.4 \frac{\text{m/s}}{\sqrt{\text{kg}}}\right)\sqrt{m}$ (b) 3.89 kg
20. $\sqrt{\frac{mL \tan \theta}{4Mg}}$ where $\tan \theta = \sqrt{\left(\frac{L}{2D - L}\right)^2 - 1}$
22. (a) zero (b) 0.300 m
24. 0.800 m / s
26. ±6.67 cm
28. (b) 18.0 rad / m, 0.0833 s, 75.4 rad / s, 4.20 m / s
(c) $y(x, t)$ = (0.200 m) sin (18.0x / m + 75.4t / s – 0.151 rad)
30. (a) –1.51 m / s, 0 (b) 16.0 m, 0.500 s, 32.0 m / s
32. (a) 0.0215 m (b) 1.95 rad (c) 5.41 m / s
(d) $y(x, t)$ = (0.0215 m)sin (8.38x rad / m + 80.0πt rad / s + 1.95 rad)
34. 30.0 m in positive x-direction
36. (a) $y = (2.00 \times 10^{-4}\ \text{m}) \sin (16.0x - 3140t)$ (b) 158 N
38. 1.07 kW
40. (a) $\wp$ remains constant (b) $\wp$ remains constant
(c) $\wp$ remains constant (d) $\wp$ is quadrupled
42. (a) $y = (7.50 \times 10^{-2}\ \text{m}) \sin(4.19x - 314t)$ (b) 625 W
44. $\sqrt{2}\ \wp_{\text{original}}$
48. (b) $f(x + vt) = \frac{1}{2}(x + vt)^2$, $g(x - vt) = \frac{1}{2}(x - vt)^2$
(c) $f(x + vt) = \frac{1}{2} \sin (x + vt)$, $g(x - vt) = \frac{1}{2} \sin (x - vt)$
50. (a) 0.0400 m (b) 0.0314 m (c) 0.477 Hz (d) 2.09 s (e) positive x-direction
52. 0.456 m / s
54. (a) 179 m / s (b) 17.7 kW
56. (a) $2Mg$ (b) $L_0 + \frac{2Mg}{k}$ (c) $\sqrt{\frac{2Mg}{m}\left(L_0 + \frac{2Mg}{k}\right)}$
58. (a) $v = \sqrt{T / [\rho(10^{-3}x + 10^{-2})10^{-4}]}$ m / s (b) 94.3 m / s, 66.7 m / s
62. (a) 5.00 m / s, positive x-direction (b) 5.00 m / s, negative x-direction
(c) 7.50 m / s, negative x-direction (d) 24.0 m / s, positive x-direction
64. (a) $v = \sqrt{kL / \mu}$ (b) 31.6 m / s
66. (a) $\frac{\mu\omega^2}{2k} A_0^2 e^{-2bx}$ (b) $\frac{\mu\omega^2}{2k} A_0^2$ (c) e^{-2bx}

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