Chapter 12 Even Answers

2. $F_y + R_y - F_g = 0,\ F_x - R_x = 0,\ F_y l \cos\theta - F_g\left(\frac{l}{2}\right)\cos\theta - F_x l \sin = 0$

4. 3.01 kN

8. 0.750 m

10. $x_{cg} = 2.54$ m, $y_{cg} = 4.75$ m

12. 8.33%

14. (a) $\left[\frac{1}{2}m_1 g + \left(\frac{x}{L}\right)m_2 g\right]\cot\theta,\ (m_1 + m_2)g$ (b) $\frac{[(1/2)\,m_1 g + (d/L)m_2 g]\cot\theta}{(m_1 + m_2)g}$

16. 0.643 m

18. $F_{\text{top}} = 36.7$ N (left), $F_{\text{bottom}} = 31.2$ N (right)

20. 1 / 3 by left string, 2 / 3 by right string

22. $3L/4$

24. (a) 73.6 kN (b) 2.50 mm

26. ~ 1 cm

28. 9.85×10^{-5}

30. 0.0293 mm

32. 1035 kg / m^3

34. (a) 6.89 mm (b) No

36. 3.51×10^8 N / m^2

38. 48.0 N

40. $Mg\frac{\sin\beta}{\sin(\alpha + \beta)}$ (left side) , $Mg\frac{\sin\alpha}{\sin(\alpha + \beta)}$ (right side)

42. (b) $T = 343$ N, $R_x = 171$ N (to right), $R_y = 683$ N (up) (c) 5.13 m

44. $T = 1.46$ kN, $H = 1.33$ kN (to right), $V = 2.58$ kN (up)

46. $F_{Ax} = 6.47 \times 10^5$ N (left), $F_{Bx} = 6.47 \times 10^5$ N (right), $F_{Ay} = 1.27 \times 10^5$ N (up)

48. 0.268

50. $T = 1.68$ kN, $R = 2.34$ kN, $\theta = 21.2°$

52. (b) $T_1 = T_2 = 1.44$ kN, $T_3 = 1.42$ kN

54. (a) 120 N (b) 0.300
(c) 103 N applied at 31.0° above horizontal at upper left corner

56. $(2/5)R$

58. (c) in AB, compression = 732 N; in BC, compression = 897 N; in AC, tension = 634 N

60. (a) $x_{cg} = 9.09$ m, $y_{cg} = 10.9$ m (b) $x_{cg} = 10.0$ m, $y_{cg} = 10.9$ m (c) 0.144 m / s

62. $(3/8)F_g$

64. (a) $P_1 = P_3 = 1.67$ N, $P_2 = 3.33$ N (b) 2.36 N

66. 4.90 cm

68. $y_{cg} = 16.7$ cm

70. 5.73 rad / s

72. $n_A = 11.0$ kN, $n_E = 3.67$ kN; $F_{AB} = F_{DE} = 7.35$ kN (compression);
$F_{AC} = F_{CE} = 6.37$ kN (tension); $F_{BC} = F_{CD} = 4.24$ kN (tension);
$F_{BD} = 8.49$ kN (compression)