Chapter 5 WS # 2 Pr: 28,29,33,40-43

Problems

28. The systems shown in Figure P5.28 are in equilibrium. W If the spring scales are calibrated in newtons, what do they read? Ignore the masses of the pulleys and strings and assume the pulleys and the incline in Figure P5.28d are frictionless.

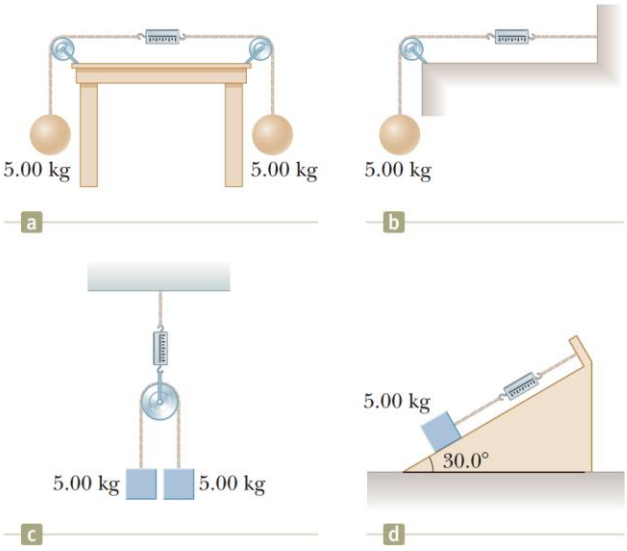

Figure P5.28

29. Assume the three blocks portrayed in Figure P5.29 M move on a frictionless surface and a 42-N force acts as shown on the 3.0-kg block. Determine (a) the acceleration given this system, (b) the tension in the cord connecting the 3.0-kg and the 1.0-kg blocks, and (c) the force exerted by the 1.0-kg block on the 2.0-kg block.

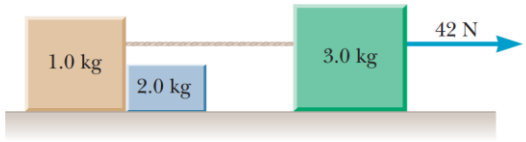

Figure P5.29

33. A bag of cement weighing 325 N AMT hangs in equilibrium from W three wires as suggested in Figure P5.33. Two of the wires make angles $\theta_1 = 60.0°$ and $\theta_2 = 40.0°$ with the horizontal. Assuming the system is in equilibrium, find the tensions T_1, T_2, and T_3 in the wires.

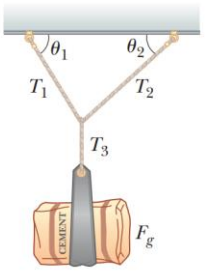

Figure P5.33

40. An object of mass $m_1 = 5.00$ kg AMT placed on a frictionless, horizon- W tal table is connected to a string that passes over a pulley and then is fastened to a hanging object of mass $m_2 = 9.00$ kg as shown in Figure P5.40. (a) Draw free-body diagrams of both objects. Find (b) the magnitude of the acceleration of the objects and (c) the tension in the string.

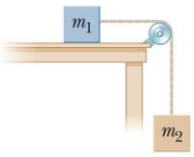

Figure P5.40

41. Figure P5.41 shows the speed of a person's body as he does a chin-up. Assume the motion is vertical and the mass of the person's body is 64.0 kg. Determine the force exerted by the chin-up bar on his body at (a) $t = 0$, (b) $t = 0.5$ s, (c) $t = 1.1$ s, and (d) $t = 1.6$ s.

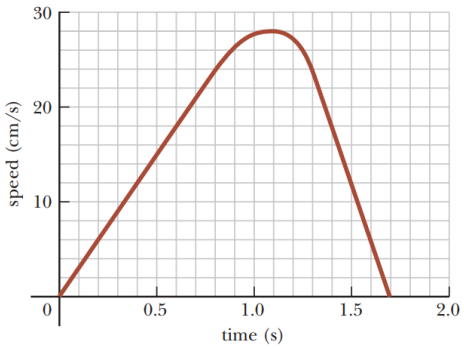

Figure P5.41

42. Two objects are connected by a light string that passes over a frictionless pulley as shown in Figure P5.42. Assume the incline is frictionless and take $m_1 = 2.00$ kg, $m_2 = 6.00$ kg, and $\theta = 55.0°$. (a) Draw free-body diagrams of both objects. Find (b) the magnitude of the acceleration of the objects, (c) the tension in the string, and (d) the speed of each object 2.00 s after it is released from rest.

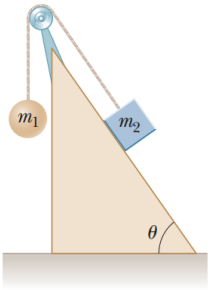

Figure P5.42

43. Two blocks, each of mass $m = 3.50$ kg, are hung from the ceiling of an elevator as in Figure P5.43. (a) If the elevator moves with an upward acceleration $\vec{a}$ of magnitude 1.60 m/s², find the tensions T_1 and T_2 in the upper and lower strings. (b) If the strings can withstand a maximum tension of 85.0 N, what maximum acceleration can the elevator have before a string breaks?

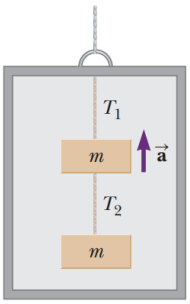

Figure P5.43

28) 49N, 49N, 98 N, 24.5 N 29) 7 m/s², 21 N, 14 N 33) 325 N, 253 N, 165 N 40)6.30 m/s², 31.5 N
41) 646 N, 627 N, 589 N 42) 3.57 m/s², 26.7 N, 7.14 m/s 43) 39.9 N, 79.8 N, 2.34 m/s²