II-1, 5-03, B

What is the value of \( a \) for an object with constant velocity? (A "stationary" object has a constant velocity, too. Its velocity is constant at zero.) What does this say about the forces acting on the object?

II-2, 5-16, C

The passenger will have the same acceleration as the elevator, so you can draw a free-body diagram for the passenger, where the forces acting on them are weight and a normal force from the floor. If one of these forces is larger than the other, the passenger will accelerate (along with the elevator).

II-3, 5-17, C

Find \( a \) by using Newton’s 2nd Law. Parts (b) and (c) are constant-acceleration problems, \( a \) = 0 Chapter 2.

II-4, 5-34, B

Object-on-a-ramp problems are very common, so you should learn how to quickly draw the appropriate diagram. In part (a) you are told that \( a = 0 \), so \( F_{\text{net}} = 0 \). Part (b) has an acceleration, so \( F_{\text{net}} = ma \).

II-5, 5-29, B

The sphere is acted upon by gravity, tension in the cord, and the wind. Draw a diagram. The problem does not explicitly say "the sphere is motionless", but that's the idea. Write out force statements for the \( x \) and \( y \) directions, and then you'll have two equations with two unknowns (\( F_{\text{wind}} \) and \( T \)). You should know how to proceed from that point by now.

II-6, 5-34, B

All the penguins have the same \( a \). A force of 222 N is accelerating all of them (mass of 20 kg + 15 kg + m + 12 kg) at \( a \), and a force of 111 N is accelerating two of them (mass \( m + 12 \) kg) at \( a \), also.
II-7, 5-35, A

Sometimes in force-analysis problems, you need to choose your "system" rather carefully. In part (a), consider the parachutist and parachute as the system, feeling their combined weight, and the force of air on the chute. In part (b), consider the parachute alone. The force on the chute from the person is not the person's weight. Find the force with \( F_{\text{net}} = ma \). Can you explain why the force is not the person's weight?

II-8, 5-41, B

This problem is a bit like the blocks in Q9 and the penguins in Q4. When asked about the force being applied by any particular link, think about how much mass that force is responsible for accelerating. For example, in part (b), "the force on link 2 from link 3", note that link 3 is pulling the mass of both link 2 and link 1 along at the given acceleration of \( +2.5 \text{ m/s}^2 \).

II-9, 5-47, A

If the monkey pulls down with force \( F \), Newton's 3rd Law says the rope pulls the monkey up with force \( F \), too. Forces acting on the monkey, then, are \( F \) and its weight. The minimum force to lift the package would be its weight. So, set \( F \) equal to the package's weight, and then find the monkey's acceleration. (\( F \) is, basically, the rope's tension.) In later parts of the problem, \( F \) becomes unknown, but not zero. There is always some force from the rope on the monkey and on the package. Eliminate \( F \) from the equations algebraically to get a value of \( a \) in part (b), and use that \( a \) to get \( F \) in part (d).

II-10, 5-53, A

Initially, \( F_{\text{net}} = F_{\text{lift}} - Mg = -M\alpha \). After dropping some amount of mass, \( m \), we have \( F_{\text{net}} = F_{\text{lift}} - (M-m)g = -(M-m)\alpha \). I've written the absolute value of \( a \) and put in the direction of the accelerations explicitly, to make it clear that the first one is downwards. Eliminate the unknown \( F_{\text{lift}} \), and find \( m \) in terms of \( a \).