

Part A

You may answer as many questions as you like. Be aware that you need to finish in this block. You must do a minimum of 50 points. Your reasons should focus on concepts from this chapter. If you see (RO) following a problem you only need to write reasons.

1. An elevator of mass 2500kg is on the third floor of a building. Just as the last passenger steps off the elevator the cable snaps sending the elevator free falling down the three floors and into the basement. In the basement is a spring with a spring constant of 42500N/m. How far does the falling elevator compress the spring if each floor has a height of 5.00m? (20)
2. Hanna is out at the range using a bow an arrow. She pulls back on the bow with an average force of 350.0N for a distance of 0.65m. How fast does the 110g arrow leave the bow? (20)
3. How high will a ball thrown upwards at 26.0m/s on the earth rise? (10)
4. You pull a wagon with a force of 34.5N by its handle that makes an angle of 37.0° with the horizontal. If you move the wagon a distance of 4.00m across a level field how much work have you done? (10)
5. Tarzan is running along level ground at a velocity of 17.4m/s to get away from a leopard when he grabs a vine hanging straight down. How high does he swing on the vine? (10)
6. The projectile launcher I used in class launches a 57.0g ball bearing at a velocity of 4.92m/s when the spring is compressed a distance of 0.14m. What is the spring constant of the spring used in this launcher? (10)
7. In the World's Strongest Man competition one of the events is to pull a rowboat up an inclined ramp in as little time as possible. The boats have a mass of 1670kg and the ramp is a length of 25.0m at an incline of 32.0° to the horizontal. The coefficient of friction between the boat and the ramp is 0.689. How much energy do the strong men use to get the boat to the top of the ramp? (30)
8. A ball is dropped from a height of 2.25m above the floor. Upon hitting the floor the ball loses some of its kinetic energy to nonconservative forces. If the ball rises to 1.95m after this first bounce how high will it rise on the next bounce? (20)