Activity

Energy Equation Calculation Problems

Practice Problems

1. A 54 kg skier, including equipment, stands at the top of a black diamond ski run. The vertical distance to the bottom of the run is 420 m. What is the gravitational potential energy of the skier relative to the bottom of the ski run?

2. A satellite has a mass of 689 kg and travels at a speed of 27 000 km/h (7500 m/s). How much mechanical kinetic energy does the satellite have?

3. A bowling ball is rolling down the lane at 2.8 m/s. If it has a mechanical kinetic energy of 25.5 J, what is its mass?

4. A person who has a mass of 65 kg goes on the Sky Tower ride at an amusement park. The ride is simply a free fall from the top of a tower into a net below. If the person reaches a final velocity of 24.6 m/s just before hitting the net, from what height did the rider drop? Ignore friction with the air.

Study the sample problem on pages 213 and 214 to understand how to use the two energy equations you just learned. Then solve the practice problems below.

1. A 54 kg skier, including equipment, stands at the top of a black diamond ski run. The vertical distance to the bottom of the run is 420 m. What is the gravitational potential energy of the skier relative to the bottom of the ski run?

$$E_g = mg\Delta h$$

$$E_g = (54 \text{ kg})(9.8 \tfrac{m}{s^2})(420 \text{ m})$$

$$E_g = \boxed{222264}\boxed{\frac{kg\,m^2}{s^2}} = J$$

$$2.2 \times 10^5$$