PHY180F Tutorial Questions

Oct 5

1. A model rocket (15 kg) is flying straight up at 25 m/s when it explodes into two equal pieces. Assume that the pieces move only vertically. If the explosion converted 375 J of chemical energy into kinetic energy, what are the velocities of each piece immediately after the explosion?

2. A truck (2500 kg) moving at 35 m/s rear-ends a car (1500 kg) moving at 22 m/s. What range of speeds might the car have after the collision?

3. A cart (350 g) moving at 1.5 m/s collides elastically with a second cart (320 g) which is initially at rest. The second cart proceeds to bounce elastically off a wall, following which it has another elastic collision with the first cart. What is the final velocity of the first cart after the second collision?