System of Particles and of Conservation of Momentum
Concept Questions

Question 1: Drop a stone from the top of a high cliff. Consider the earth and the stone as a system. As the stone falls, the momentum of the system

1. increases in the downward direction.

2. decreases in the downward direction.

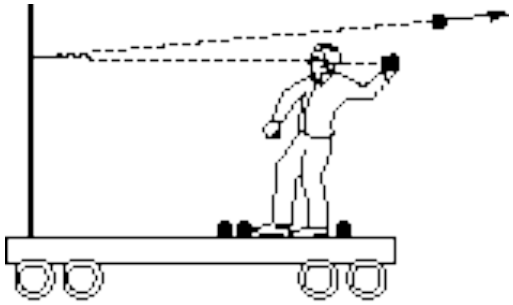
3. stays the same.

4. not enough information to decide.

Question 2: Consider yourself and the Earth as one system. Now jump up. Does the momentum of the system

1. increase in the downward direction as you rise?
2. increase in the downward direction as you fall?
3. stay the same?
4. dissipate because of friction?
5. Not enough information is given to decide.

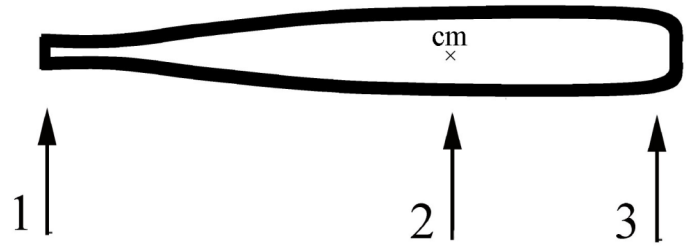
Question 3. Suppose you are on a cart, initially at rest on a track with very little friction. You throw balls at a partition that is rigidly mounted on the cart. If the balls bounce straight back as shown in the figure, is the cart put in motion?



1. Yes, it moves to the right.
2. Yes, it moves to the left.
3. No, it remains in place.
4. Not enough information is given to decide.

Question 5: Pushing a Baseball Bat

The greatest acceleration of the center of mass of a baseball bat will be produced by pushing with a force F at



1. Position 1
2. Position 2
3. Position 3
4. All the same
5. Not enough information is given to decide.

Question 6 A compact car and a large truck collide head on and stick together. Which undergoes the larger momentum change?

1. car
2. truck
3. The momentum change is the same for both vehicles.
4. Can't tell without knowing the final velocity of combined mass.

8.01SC Physics I: Classical Mechanics