

You drop a ball from a high tower and it falls freely under the influence of gravitational force. If you can ignore resistive forces, which of the following statements are true?



1. The kinetic energy of the ball increases by equal amounts in equal times.
2. The kinetic energy of the ball increases by equal amounts over equal distances.
3. There is zero work done on the ball by the gravitational force as it falls.
4. The work done on the ball by the gravitational force is negative as it falls.
5. The total mechanical energy of the ball decreases as it falls.
6. None are true.
7. More than one statement is true.

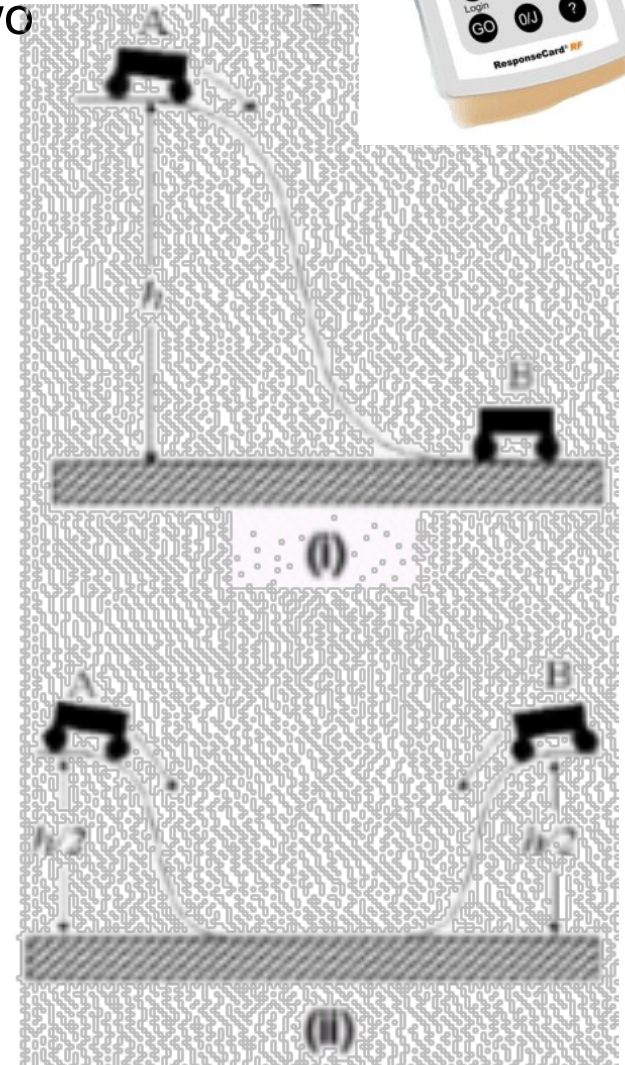
Two identical carts A and B roll down a hill and collide as shown in the figures at the right.

(i): A starts from rest. It rolls down and collides head-on with B which is initially at rest on the ground. The two carts stick together.

(ii): A and B are at rest on opposite hills. They roll down, collide head-on and stick together.

Which statement is true about the two-cart system just before the carts collide in the two cases?

1. The momentum of the system is zero in case (ii).
2. The momentum of the system is greater in case (i) than in case (ii).
3. The momentum of the system is greater in case (ii) than in case (i).
4. The momentum of the system is the same in both cases (but not 0).
5. More than one statement is true.



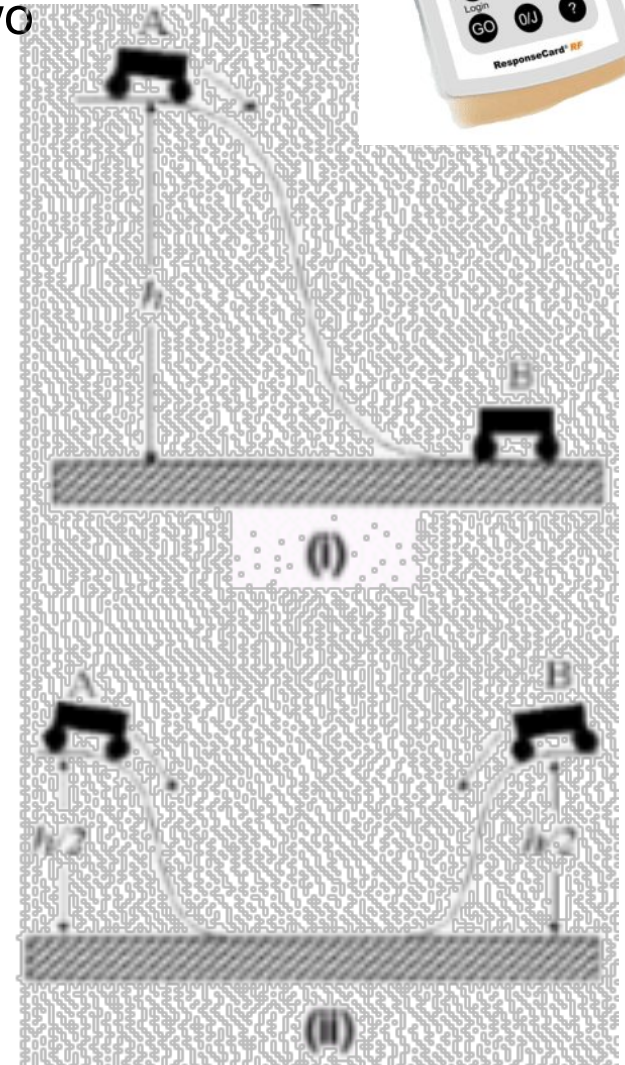
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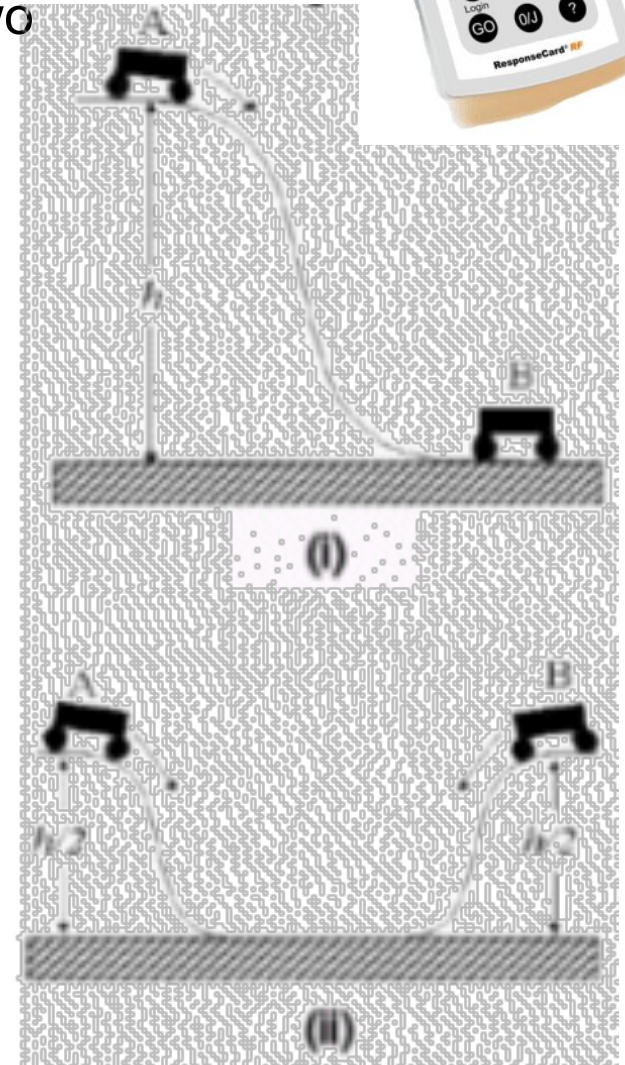
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