Elastic and inelastic collisions

A 2 kg cart moving right with a speed of 5m/s collides and sticks to a 3kg cart moving left with a speed of 10m/s. What is the total kinetic energy of the two cart system after the collision?

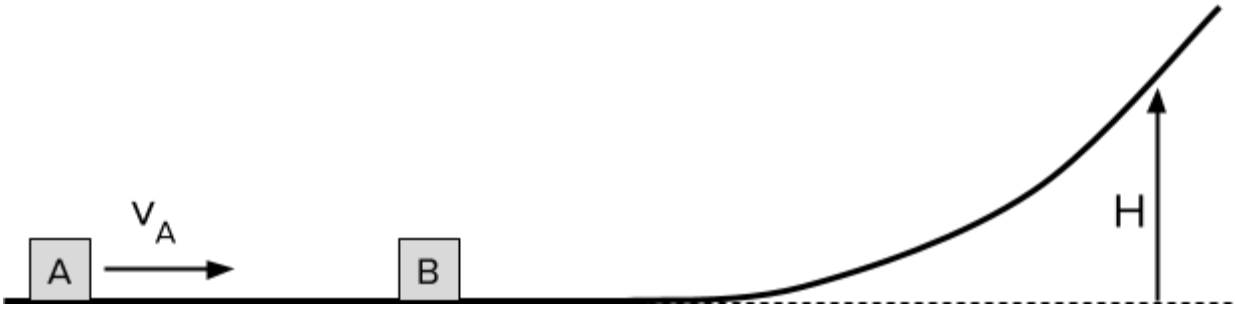
(A) 16 J
(B) 24 J
(C) 40 J
(D) 52 J

Answer:

A 3.0 kg cart is traveling to the right at a speed of 4.0 m/s and collides head on with a cart moving to the left with a speed of 4.0 m/s. After the collision, both carts have a speed of 4.0 m/s. Which of the following could be the mass of the second cart? Select two answers.

(A) 1.5 kg
(B) 3.0 kg
(C) 6.0 kg
(D) Negligible compared to the mass of the first cart

Answer:



Block A, of mass M, is moving with a speed v_A to the right along a frictionless surface when it has a perfectly elastic collision with Block B (also of mass M) which makes block B slide up to a height H on the frictionless ramp. If the block A is sent in with a speed $4v_A$, causing another elastic collision, what will be the new height block B will slide up the ramp?

(A) H
(B) 2H
(C) 4H
(D) 16H

Answer:

Block A, of mass M, is moving with a speed v_A to the right along a frictionless surface when it has a perfectly elastic collision with Block B (also of mass M) which makes block B slide up to a height H on the frictionless ramp. If the block A were again sent in with a speed $v_{A,}$ but the collision were perfectly inelastic, what would be the new height block B will slide up the ramp?

(A) H/4
(B) H/2
(C) H
(D) 2H

Answer:

Block A, of mass M, is moving with a speed v_A to the right along a frictionless surface when it has a perfectly elastic collision with Block B (also of mass M). The speed v_A is the minimum speed that causes the mass B to slide over the frictionless bump. Now a different block C of mass 3M collides and sticks to block B. What is the minimum speed block C must travel (in terms of v_A) in order for block B to slide over the frictionless bump?

(A) 0.5 v_A
(B) $3v_A/4$
(C) $2v_A$
(D) $4v_A/3$

Answer:

A cart of mass M travels to the right with a speed v_o and collides in a perfectly elastic collision with a 4M mass at rest. Which one of the following are possible final velocities after the collision?

	Cart of mass M	**Cart of mass 4M**
(A)	$v_o/2$ to the right	$v_o/8$ to the right
(B)	$3v_o/4$ to the left	$v_o/4$ to the right
(C)	$3v_o/5$ to the left	$2v_o/5$ to the right
(D)	$4v_o/3$ to the left	$v_o/3$ to the right

Answer:

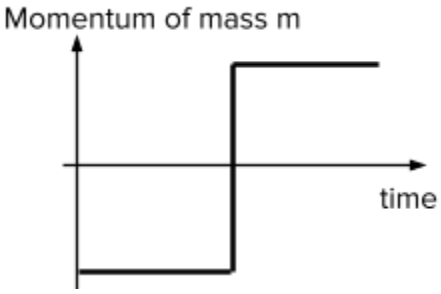
Two blocks of mass 3M and M are released from rest at the top of two identical frictionless ramps. The blocks collide and stick together. Consider the time interval from right after the blocks are released until right after the collision. What happens to the total mechanical energy of the system consisting of the two blocks and the Earth, and what happens to the mechanical energy of the system consisting of just the two blocks?

	Mechanical energy of the blocks-Earth system	**Mechanical energy of blocks**
(A)	Increases	Increases
(B)	Decreases	Decreases
(C)	Remains the same	Decreases
(D)	Decreases	Increases

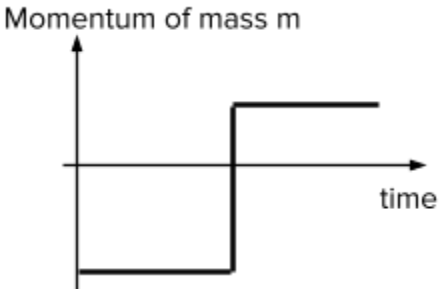
Answer:

Two carts of mass 3m and m head toward each other on a frictionless track with the same speed and stick together as seen in the diagram above. Which of the following graphs below could represent the momentum of the cart of mass m as a function of time before and after the collision?

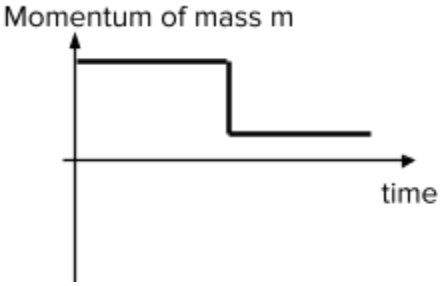
(A)



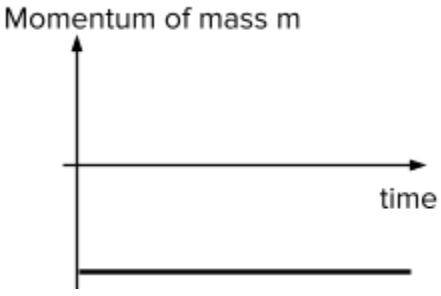
(B)



(C)



(D)



Answer:

A cart of mass M strikes and sticks to a cart of equal mass that is initially at rest. The initial speed of the first cart is known to be 6.0 m/s $\pm$ 0.4 m/s. What is the possible range of final speeds of the combined masses?

(A) 2.8 m/s to 3.2 m/s
(B) 2.6 m/s to 3.4 m/s
(C) 3.0 m/s to 3.6 m/s
(D) 2.6 m/s to 3.0 m/s

Answer:

A bouncy ball is released from a height H and it rebounds off the ground back to a height 3H/4. What can be said about the collision with the ground?

(A) It was elastic since kinetic energy was not conserved
(B) It was inelastic since kinetic energy was not conserved
(C) It was elastic since kinetic energy was conserved
(D) It was inelastic since kinetic energy was conserved

Answer: