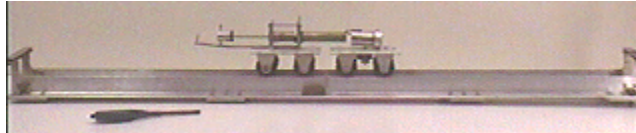


Answer #207

The answer is (c): the carts will reach their respective ends at the same time, as seen in an mpeg video by clicking your mouse on the photograph below.



The mass of the receptacle cart plus the mass of the projectile is approximately equal to the mass of the cannon cart. This means that when the projectile is shot from the cannon cart into the receptacle cart the forces on the two carts are equal and opposite, so they will leave the collision with equal and opposite speeds and therefore arrive at their respective ends simultaneously.

Another way to view the action is to recognize that in the absence of any external force the center of mass of the system must remain at the same point. Because the mass of the cannon cart is equal to the sum of the masses of the projectile plus the receptacle cart, the two carts must move away from the explosion with equal speeds and therefore arrive at their respective ends simultaneously.

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