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Example elastic collision

Imagine a game of pool where the balls collide and bounce off each other, perfectly transferring energy without any loss. This fascinating phenomenon is known as an elastic collision. In these types of collisions, both momentum and kinetic energy are conserved, making them a key concept in physics.Elastic collisions occur when two or more objects collide and bounce off each other without any loss of kinetic energy. In these scenarios, both momentum and kinetic energy remain conserved.An elastic collision is defined as a collision where the total kinetic energy before the collision equals the total kinetic energy after the collision. This means that the objects involved maintain their speed and direction post-collision. An example is when two billiard balls collide on a pool table; they transfer energy while keeping their respective speeds intact.Several key characteristics define elastic collisions:Momentum Conservation: The total momentum of all involved objects before the collision equals the total momentum afterward.Kinetic Energy Conservation: The sum of kinetic energies remains unchanged throughout the process.No Deformation: Objects retain their shape, showing no permanent deformations after impact.Rebound Effect: After colliding, objects typically rebound with similar velocities to those they had prior to impact.These characteristics make elastic collisions essential in various fields, including physics and engineering.Elastic collisions occur in various real-world scenarios. These instances demonstrate the principles of conservation of momentum and kinetic energy effectively.In everyday life, elastic collisions are evident in several activities:Billiards: When billiard balls collide, they transfer energy without losing speed. Each ball rebounds off the others while maintaining its motion.Sports: In sports like tennis or squash, when a racket strikes a ball, the collision is nearly elastic. The ball retains most of its kinetic energy after impact.Vehicles: Car crashes involving similar masses can approximate elastic collisions if the vehicles bounce off each other without crumpling.These examples highlight how elastic collisions play a vital role in understanding motion and energy transfer in practical situations.Scientists often use controlled experiments to study elastic collisions:Air Track Experiments: By using air tracks with low friction, researchers observe how gliders collide elastically. This setup allows precise measurement of velocities before and after impacts.Gas Molecules: At the molecular level, gas particles collide elastically within containers. This concept helps explain pressure and temperature changes in gases.Such laboratory settings provide valuable insights into fundamental physics concepts while demonstrating real-life applications of elastic collisions.In elastic collisions, both momentum and kinetic energy are conserved. This section delves into the mathematical principles governing these phenomena.The principle of conservation of momentum states that the total momentum before a collision equals the total momentum after. Mathematically, this is expressed as:[m_1 v_{1i} + m_2 v_{2i} = m_1 v_{1f} + m_2 v_{2f}]Where:(m_1) and (m_2) represent the masses of the colliding objects.(v_{1i}) and (v_{2i}) are their initial velocities.(v_{1f}) and (v_{2f}) denote their final velocities.This equation demonstrates that changes in velocity depend on each object's mass. For instance, if two balls collide with equal mass, they'll exchange velocities if they collide head-on.For elastic collisions, kinetic energy also remains constant. The formula for kinetic energy is:[KE = frac{1}{2} mv^2]Thus, you can write:[KE_{text{initial}} = KE_{text{final}}]Or more specifically:[0.5 m_1 v_{1i}^2 + 0.5 m_2 v_{2i}^2 = 0.5 m_1 v_{1f}^2 + 0.5 m_2 v_{2f}^2]This equation shows how both objects retain their speeds post-collision without losing energy to deformation or heat. To illustrate, consider two billiard balls striking each other: they bounce off while conserving their overall kinetic energy throughout the interaction.By analyzing these principles mathematically, you gain insight into how elastic collisions occur across various scenarios in physics and engineering applications.Elastic collisions play a significant role in various branches of physics. Understanding these interactions helps explain fundamental principles governing motion, energy transfer, and system behavior.In mechanics, elastic collisions are crucial for analyzing objects in motion. Both momentum and kinetic energy conservation provide insights into collision outcomes. For example:Billiard balls, when struck, exhibit minimal energy loss.Sports equipment, like tennis rackets or squash paddles, effectively transfer energy during impacts.Vehicle crashes involving similar masses allow the calculation of post-collision velocities using conservation laws.These scenarios emphasize the importance of accurately predicting object behavior during elastic collisions.In particle physics, elastic collisions reveal the dynamics of subatomic particles. When particles collide elastically:Energy distribution remains stable, allowing scientists to study fundamental forces.Particle accelerators utilize elastic collisions to investigate particle interactions at high speeds.Experiments with gas molecules demonstrate how individual molecular collisions contribute to thermodynamic properties.Understanding these implications enhances comprehension of both macroscopic and microscopic systems within physics. A collision occurs when two objects come in direct contact. It is the event in which two or more bodies exert forces on each other in about a relatively short time. There are two types of collisions, namely: Elastic Collision An elastic collision is one where there is no net loss in kinetic energy in the system due to the collision. Inelastic Collision An inelastic collision is a type of collision where this is a loss of kinetic energy. The lost kinetic energy is transformed into thermal energy, sound energy, and material deformation. When two bodies collide but there is no loss in the overall kinetic energy, it is called a perfectly elastic collision. An elastic collision is a collision in which there is no net loss in kinetic energy in the system due to the collision. Both momentum and kinetic energy are conserved in an elastic collision. Basically in the case of elastic collision, the kinetic energy before and after the collision remains the same and is not converted to any other form of energy. It can be either one-dimensional or two-dimensional. In the real world, perfectly elastic collision is impossible because there is bound to be some energy conversion, however small. However, though there is no change in the linear momentum of the whole system, there is a change in the individual momenta of the involved components, which are equal and opposite in magnitude and cancel each other out and the initial energy is conserved. The collision of billiard balls is nearly elastic because the kinetic energy is conserved before and after the collision When a ball at a billiard table hits another ball, it is an example of elastic collision. When you throw a ball on the ground and it bounces back to your hand, there is no net change in the kinetic energy, and hence, it is an elastic collision. Read More: Kinetic Energy Watch the video and learn more about collision The Elastic Collision formula of momentum is given by: m1u1 + m2u2 = m1v1 + m2v2 Where, m1 = Mass of 1st body m2 = Mass of 2nd body u1 =Initial velocity of 1st body u2 = Initial velocity of the second body v1 = Final velocity of the first body v2 = Final velocity of the second body The Elastic Collision formula of kinetic energy is given by: (1/2) m1u12 + (1/2) m2u22 = (1/2) m1v12 + (1/2) m2v22 Two billiard balls collide. Ball 1 moves with a velocity of 6 m/s, and ball 2 is at rest. After the collision, ball 1 comes to a complete stop. What is the velocity of ball 2 after the collision? Is this collision elastic or inelastic? The mass of each ball is 0.20 kg. Solution: To find the velocity of ball 2, use a momentum table. Objects Momentum Before Momentum After Ball 1 0.20 kg × 6 m/s = 1.2 0 Ball 2 0 0.20 kg × v2 Total 1.2 kg × m/s 0.20 kg × v2 v2 =1.2 / 0.20 = 6 m/s To determine whether the collision is elastic or inelastic, calculate the total kinetic energy of the system both before and after the collision. Objects KE Before (J) KE After (J) Ball 1 0.50 × 0.20 × 62 = 3.6 0 Ball 2 0 0.50 × 0.20 × 62 = 3.6 Total 3.6 3.6 Since the kinetic energy before the collision equals the kinetic energy after the collision (kinetic energy is conserved), this is an elastic collision. Watch the video and learn about important problems in elastic collisions Some key differences between inelastic and elastic collisions are given below in tabular format. The total kinetic energy is conserved. The total kinetic energy of the bodies at the beginning and the end of the collision is different. Momentum is conserved. Momentum is conserved. No conversion of energy takes place. Kinetic energy is changed into other energy such as sound or heat energy. Highly unlikely in the real world as there is almost always a change in energy. This is the normal form of collision in the real world. An example of this can be swinging balls or a spacecraft flying near a planet but not getting affected by its gravity in the end. An example of an inelastic collision can be the collision of two cars. The collision time affects the amount of force an object experiences during a collision. The greater the collision time, the smaller the force acting upon the object. Thus, to maximize the force experienced by an object during a collision, the collision time must be decreased. Likewise, the collision time must be increased to minimise the force. There are several real-world applications of these phenomena. The airbags in automobiles increase the collapse time and minimize the effect of force on objects during a collision. Airbag accomplishes this by extending the time required to stop the momentum of the passenger and the driver. An elastic collision is a collision in which there is no net loss in kinetic energy in the system due to the collision. Momentum is conserved in an elastic collision. When you throw a ball on the ground, and it bounces back to your hand, there is no net change in the kinetic energy, and hence, it is an elastic collision. Unlike the elastic collision, where the kinetic energy is conserved, the kinetic energy in an inelastic collision is not conserved. In an inelastic collision, the kinetic energy between the colliding bodies is different at the beginning and the end of the collision. The airbags in automobiles increase the collapse time and minimize the effect of force on objects during a collision. An inelastic collision is a type of collision where this is a loss of kinetic energy. The lost kinetic energy is transformed into thermal energy, sound energy, and material deformation.According to the law of conservation of linear momentum, if the net external force acting on a system of bodies is zero, then the system's momentum remains constant. One of the applications of conservation of momentum is the launching of rockets. The rocket fuel burns are pushed the exhaust gases downwards, and the rocket gets pushed upwards. Motorboats also work on the same principle. They push the water backwards and get pushed forwards in reaction to conserving momentum.Elastic potential energy is energy stored as a result of applying a force to deform an elastic object. The energy is stored until the force is removed and the object springs back to its original shape, doing work in the process. A contact force is any force that requires contact to occur. If two surfaces are not in contact, they can't exert a normal force on each other. If you wish to learn more physics concepts with the help of interactive video lessons, download BYJU'S – The Learning App. Put your understanding of this concept to test by answering a few MCQs. Click 'Start Quiz' to begin! Select the correct answer and click on the "Finish" buttonCheck your score and answers at the end of the quiz Visit BYJU'S for all Physics related queries and study materials 0 out of 0 arewrong 0 out of 0 are correct 0 out of 0 are Unattempted View Quiz Answers and Analysis Share — copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt — remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution — You must give appropriate credit , provide a link to the license, and indicate if changes were made . 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A collision occurs when two or more object comes in direct contact with each other. the collision can be of two types that includes, Elastic Collision and Inelastic Collision. In this article, we will learn about, Elastic Collision, Examples of Elastic Collision, Difference between Elastic Collision and Inelastic Collision, and others in detail. What is Elastic Collision?A fully elastic collision occurs when two bodies come into contact without losing any overall kinetic energy. An elastic collision is one in which the system loses no kinetic energy due to the collision. In an elastic collision, momentum and kinetic energy are both conserved. In the case of a collision, the kinetic energy before and after the collision is essentially unchanged and is not transferred to any other type of energy. The kinetic energy of an elastic collision remains constant before and after the contact. It isn't changed into another type of energy. It might be one-dimensional or two-dimensional in nature. In the real world, perfectly elastic collisions are impossible because there will always be some energy exchange, no matter how minor. There is a change in the individual momenta of the relevant components, which are equal and opposite in size and cancel each other out, and the original energy is conserved, even though the linear momentum of the overall system does not change. Elastic Collision DefinitionEleastic collision is defined as the collision in which the kinetic energy of the system is conserved. In elastic collision momentum of the system is also conserved. Inelastic Collision DefinitionInelastic collision is the collision in which the kintenic energy of the system is not conserved. For example, the kicking of ball is an example of Inelastic collision. Examples of Elastic CollisionVarious examples of the elastic collision are, A ball bounces back when it is thrown on the floor. It's because a moving ball maintains its overall momentum and kinetic energy.When two atoms collide, they produce an elastic collision, however, it is only termed an elastic collision if no energy is lost.The striking of balls with the stick while playing pool or snooker is a simple illustration of elastic collision.Elastic Collision FormulaThe momentum formula for Elastic Collision is, m1u1 + m2u2 = m1v1 + m2v2 where, m1 is the Mass of 1st bodym2 is the Mass of 2nd bodyu1 is the Initial Velocity of 1st bodyu2 is the Initial Velocity of 2nd bodyv1 is the Final Velocity of 1st bodyv2 is the Final Velocity of 2nd bodyThe kinetic energy formula for elastic collisions is, 1/2(m1u12) + 1/2(m2u22) = 1/2(m1v12) + 1/2(m2v22) Elastic Collision Formula DerivationMomentum formula for Elastic Collision is: m1u1 + m2u2 = m1v1 + m2v2 ∴ m(u1-v1) = m(v2-u2) → (Equation A) Kinetic energy formula for elastic collisions is: 1/2(m1u12) + 1/2(m2u22) = 1/2(m1v12) + 1/2(m2v22) ∴ m1(u12-v12) = m2(v22-u22) ∴ m1(u1+v1)(u1-v1) = m2(v2+u2)(v2-u2) → (Equation B) Divide Equation B to Equation A, u1 + v1 = v2 + u2 ∴ u1 - u2 = -(v1 - v2) Relative velocity of Approach = Relative Velocity of Receding Momentum formula for Elastic Collision is: m1u1 + m2u2 = m1v1 + m2v2 We have, u1 + v1 = v2 + u2 ∴ v2 = u1 + v1 - u2 Put v2 in the momentum formula for Elastic Collision, ∴ m1u1 + m2u2 = m1v1 + m2(u1 + v1 - u2) ∴ m1u1 + m2u2 = m1v1 + m2u1 + m2v1 - m2u2 ∴ m1u1 - m2u1 +2m2u2 = v1(m1 + m2) v1 = ((m1 - m2)u1 + 2m2u2) / (m1 + m2) v2 = ((m2 - m1)u2 + 2m1u1) / (m1 + m2) Elastic Vs Inelastic CollisionThe basic difference between and Elastic Collision and Inelastic Collision are shown in the table added below, Total kinetic energy is conserved in Elastic Collision Total kinetic energy is not conserved in Inelastic Collision Momemtum is conserved in case of Elastic Collision Momemtum is not conserved in case of Inelastic Collision In does not occur in general cases and is rarely seen in our daily life. It occurs in our daily life and is seen in various incident in our daily life. Examples of Elastic Colliion are, collision of atoms in the air, etc. Examples of Inelastic collision are collision of two cars, kicking of ball, etc. The basic differences between Elastic and Inelastic Collision is shown in the image added below, Applications of Elastic CollisionThe following are some of the applications for elastic collisions: The amount of force experienced by the body during the collision is affected by the amount of time involved in the collision. In other words, the smaller the force acting on the body, the longer the impact takes. As a result, in order to optimize the force, the collision duration must be reduced.However, in order to reduce the force, the contact duration must be increased. There are numerous examples of this. One of them is that airbags in cars reduce the amount of time spent in a collision and reduce the force applied to the item. The phenomenon behind this procedure is that the airbags reduce the force while increasing the object's crash time.Although an elastic collision can occur in a variety of locations or settings, inelastic collisions are more common.Read More, Law of Conservation of MometumPotential EnergyVelocityElastic Collision Formula ExamplesExample 1: A 5 kg ball moving east at a speed of 6 m/s strikes a 2 kg ball at rest. Calculate the velocities of the two balls assuming a perfectly elastic collision. Solution: Given, m1 = 5 kg, u1 = 6 m/s, m2 = 2 kg, u2 = 0To Find, v1, v2 We have, m1u1 + m2u2 = m1v1 + m2v2 ∴ (5 × 6) + (2 × 0) = 5v1 + 2v2 ∴ 30 + 0 = 5v1 + 2v2 ∴ 30 = 5v1 + 2v2 → (Equation 1) u1 + v1 = u2 + v2 ∴ 6 + v1 = 0 + v2 ∴ 6 = -v1 + v2 → (Equation 2) From Equation 1 and 2, ∴ v2 = 8.57 m/s Put v2 = 8.57 in Equation 2, -v1 + 8.57 = 6 ∴ v1 = 2.57 m/s Example 2: When a body of mass 4 kg collides with another body at rest, it continues to move in the same direction at a speed of one-third of its original speed. Determine the second body's mass. Solution: Given, To Find, m2 We have, v1 = ((m1 - m2) / (m1 + m2)) × u1 + (2m2u2) / (m1 + m2) ∴ u1/3 = ((4 - m2) / (4 + m2)) × u1 ∴ 4 + m2 = 12 - 3m2 ∴ 4m2 = 12 - 4 ∴ m2 = 2 kg Example 3: A 1 kg ball travelling at 15 m/s collides head-on with another ball of unknown mass at rest, rebounding with a velocity of 10 m/s. What is the other ball's mass? Solution: Given, m1 = 1 kgu1 = 15 m/sv1 = -10 m/s (rebounds)u2 = 0to Find, m2 We have, v1 = ((m1 - m2) / (m1 + m2)) × u1 + (2m2u2) / (m1 + m2) ∴ -10 = ((1 - m2) / (1 + m2)) × 15 ∴ -2 + (-2m2) = 3 - 3m2 ∴ m2 = 5 kg Example 4: Assume that m1 is 3 kg, m2 is 5 kg, u2 is at rest, v1 is 2.2 m/s, and v2 is 2 m/s in a specific example. What is the value of u1? Solution: Given, m1 = 3 kgm2 = 5 kgu2 = 0v1 = 2.2 m/sv2 = 2 m/sTo Find, u1 We have, m1u1 + m2u2 = m1v1 + m2v2 ∴ 3 × u1 + 5 × 0 = 3 × 2.2 + 5 × 2 ∴ 3u1 = 6.6 + 10 ∴ u1 = 5.53 m/s Example 5: If u1 is 4 m/s, u2 is 2 m/s, and v2 is 6 m/s, the following equation can be used. What is the significance of v1? Solution: Given, u1 = 4 m/su2 = 2 m/sv2 = 6 m/sTo Find, v1 u1 + v1 = v2 + u2 ∴ 4 + v1 = 6 + 2 ∴ v1 = 8 - 4 ∴ v1 = 4 m/s Practice Questions on Elastic CollisionsQ1. If u1 is 12 m/s, u2 is 5 m/s, and v2 is 8 m/s, then find the v1 of the collision if the mass of object is m. Q2. If u1 is 8 m/s, u2 is 10 m/s, and v2 is 6 m/s, the following equation can be used. What is the significance of v1? Q3. A box of mass 12 kg is sliding at 15 m/s collides head-on with another box of unknown mass at rest, rebounding with a velocity of 10 m/s. What is the mass of other box? Q4. When a body of mass 12 kg collides with another body at rest, it continues to move in the same direction at a speed of one-fourth of its original speed. Determine the mass of second body. Fact Checked Content Last Updated: 22.07.2022 7 min reading time Content creation process designed by Content quality checked by Save Article Save Article Elastic collisions are collisions in which the total kinetic energy stays the same before and after the collision. However, the kinetic energies of individual objects can change. Elastic Collision: A collision in which the total kinetic energy of the objects stays the same throughout the collision.As in the example of playing pool, a moving ball can hit a stationary ball and make it move as well. A moving ball has a certain velocity and thus also has kinetic energy. When it hits a stationary ball, it transfers some of its energy to the other ball. This means that the kinetic energy of the moving ball decreases, and the kinetic energy of the stationary ball increases. When both objects are moving and hit each other, an elastic collision can still happen. The total kinetic energy and momentum will still be conserved, but the formulas for the final velocities will differ from the stationary target case. After a moving ball hits a stationary ball, it transfers some of its kinetic energy to the other. They both may have a final velocity after the collision. StudySmarter OriginalsWhen an object with mass \(m_1\) and an initial velocity \(V_{1i}\) hits a stationary ball with mass \(m_2\), the object with mass \(m_1\) has a final velocity \(V_{1f}\) and the object with mass \(m_2\) has a final velocity \(V_{2f}\). The net linear momentum is conserved, that's why the total momentum stays the same before and after the collision.The equation for the linear momentum conservation can be written as: Equation 1: \(m_1V_{1i}=m_1V_{1f}+m_2V_{2f}\)The equation for the kinetic energy conservation can be written as:Equation 2: \(\frac 1 2 m_1(V_{1i})^2=\frac 1 2 m_1(V_{1f})^2+\frac 1 2m_2(V_{2f})^2\)To find the final velocities, we can do some algebra. We can convert the momentum equation to: Equation 3: \(m_1V_{1i}-m_1V_{1f}=m_2V_{2f}\)Since \(m_1\) is common on the left side, we can rearrange the equation:Equation 4: \(m_1(V_{1i}-V_{1f})=m_2V_{2f}\)We can rearrange the energy equation as well. First of all, we can multiply the equation by 2.Equation 5: \(m_1(V_{1i})^2=m_1(V_{1f})^2+m_2(V_{2f})^2\)We can move \(m_1(V_{1f})^2\) to the left side.Equation 6: \(m_1(V_{1i})^2-m_1(V_{1f})^2=m_2(V_{2f})^2\)Since \(m_1\) is common on the left side, we can now rearrange the equation:Equation 7: \(m_1((V_{1i})^2-(V_{1f})^2)=m_2(V_{2f})^2\)Because we are subtracting two items that are in the square form, we can rewrite it as:Equation 8: \(m_1(V_{1i}+V_{1f})(V_{1i}-V_{1f})=m_2(V_{2f})^2\)After dividing Equation 8 by Equation 4 and then rearranging, we can find the elastic collision formulas for the stationary target case.$$V_{1f}=\frac {m_1-m_2}{m_1+m_2}V_{1i}$$$$V_{2f}=\frac {2m_1}{m_1+m_2}V_{1i}$$Both moving balls with velocities can have different final velocities after an elastic collision. The total kinetic energy is still conserved. StudySmarter Originals When an object with mass \(m_1\) and an initial velocity \(V_{1i}\) hits a ball with mass \(m_2\) and an initial velocity \(V_{2i}\), the object with mass \(m_1\) has a final velocity \(V_{1f}\) and the object with mass \(m_2\) has a final velocity \(V_{2f}\).We can write the momentum conservation can be expressed as:Equation 10: \(m_1V_{1i}+m_2V_{2i}=m_1V_{1f}+m_2V_{2f}\)We can write the kinetic energy conservation as:Equation 11: \(\frac 12m_1(V_{1i})^2+\frac 12m_2(V_{2i})^2=\frac 12m_1(V_{1f})^2+\frac 12m_2(V_{2f})^2\)We can rearrange Equation 10:Equation 12: \(m_1V_{1i}-m_1V_{1f}=m_2V_{2f}-m_2V_{2i}\)Equation 13: \(m_1(V_{1i}-V_{1f})=-m_2(V_{2i}-V_{2f})\)Also, we can rearrange Equation 11:Equation 14: \(m_1(V_{1i}-V_{1f})(V_{1i}+V_{1f})=-m_2(V_{2i}-V_{2f})(V_{2i}+V_{2f})\)We can divide Equation 14 by Equation 13 and rearrange it to get the formulas for the final velocities of the objects:$$V_{1f}=\frac{m_1-m_2}{m_1+m_2}V_{1i}+\frac{2m_2}{m_1+m_2}V_{2i}$$$$V_{2f}=\frac{2m_1}{m_1+m_2}V_{1i}+\frac{m_2-m_1}{m_1+m_2}V_{2i}$$For the stationary target case, our velocity equations are:$$V_{1f}=\frac {m_1-m_2}{m_1+m_2}V_{1i}$$$$V_{2f}=\frac {2m_1}{m_1+m_2}V_{1i}$$For the moving target case, our final velocity equations are different:$$V_{1f}=\frac{m_1-m_2}{m_1+m_2}V_{1i}+\frac{2m_2}{m_1+m_2}V_{2i}$$$$V_{2f}=\frac{2m_1}{m_1+m_2}V_{1i}+\frac{m_2-m_1}{m_1+m_2}V_{2i}$$A ball with a mass of 2 kg is moving to the right with a velocity of 4 m/s and hits a stationary ball with a mass of 1 kg at the billiard table. What are the final velocities of the balls?Solution:To find the final velocities, we can use Equation 9. As given in the example, \(V_{1i}=4 \frac ms\) and \(m_1=2 kg\). We can insert these values into the equation.$$V_{1f}=\frac {2 kg - 1 kg}{2 kg + 1 kg}\times 4 \frac ms = \frac 1 3 \times 4 \frac ms = \frac 4 3 \frac ms$$ $$V_{2f}=\frac {2 \times 2 kg}{2 kg + 1 kg}\times 4 \frac ms = \frac 4 3 \times 4 \frac ms = \frac {16} 3 \frac ms$$A ball with a mass of 6 kg and an initial velocity of 4 m/s hits another ball with a mass of 4 kg and an initial velocity of 2 m/s. They both are moving to the right. What are their final velocities after the collision?Solution:We can use our formula from above to find the final velocities. Here, \(m_1=6 kg\) and \(m_2=4 kg\), \(V_{1i} = 4 \frac ms\) and \(V_{2i}=2 \frac ms\).$$V_{1f}=\frac{6 kg-4 kg}{6 kg+4 kg}\times 4 \frac ms + \frac{2\times 4 kg}{6 kg+4 kg}\times 2 \frac ms$$$$V_{1f}= \frac 2{10}\times 4+ \frac 8{10}\times 2 = \frac 8{10}+\frac{16}{10}=\frac{24}{10}\Rightarrow 2.4 \frac ms$$$$V_{2f}=\frac{2\times6 kg}{6 kg + 4 kg}\times 4\frac ms + \frac{4 kg - 6 kg}{6 kg + 4 kg}\times 2\frac ms$$$$V_{2f} = \frac {12}{10}\times 4 + \frac{-2}{10}\times 2 = \frac{48}{10}-\frac 4{10} = \frac{44}{10}\Rightarrow 4.4 \frac ms$$Elastic collisions are collisions in which the total kinetic energy stays the same before and after the collision. The kinetic energies of individual objects can change after the collision.The net linear momentum is conserved.Playing pool and other situations involving bouncing balls can be examples of elastic collision. What are examples of elastic collisions? Playing pool and other situations involving bouncing balls can be examples of elastic collision. What is elastic collision? Elastic collisions are collisions in which the total kinetic energy stays the same before and after the collision. Is momentum conserved in an elastic collision? What is the difference between elastic and inelastic collision? While energy is conserved in elastic collisions, it is not conserved in inelastic collisions. Is kinetic energy conserved in an elastic collision? Save Article At StudySmarter, we have created a learning platform that serves millions of students. Meet the people who work hard to deliver fact based content as well as making sure it is verified. Lily Hulatt is a Digital Content Specialist with over three years of experience in content strategy and curriculum design. She gained her PhD in English Literature from Durham University in 2022, taught in Durham University's English Studies Department, and has contributed to a number of publications. 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