

Quiz 07: Collisions

Answer the questions using your clicker. If there are no multiple choices, the question is true/false. Use the T and F keys to respond. Please do not mark on this quiz paper. Each question is worth 3 points.

1. The data on the right are for the ballistic pendulum. Use the average angle to determine the **height** to which the pendulum rises after the collision.

m (kg)	M (kg)	L (m)	θ_1 (°)	θ_2 (°)	θ_3 (°)
0.0075	0.08	0.204	19	19	18

- A) 0.0104m **B) 0.0107m** C) 0.0111m D) 0.0115m E) 0.0119m
2. Find the **speed** v_1 of the ball+block just **after** the collision.
 A) 0.431 m/s B) 0.452 m/s **C) 0.458m/s** D) 0.483 m/s E) 0.499 m/s
3. The average **velocity** v_o of the ball just **before** the collision is
 A) 5.27 m/s **B) 5.34 m/s** C) 5.40 m/s D) 5.53 m/s E) 5.64 m/s
4. When the spring is released to launch the ball,
 A) kinetic energy of the ball is converted to potential energy of the spring.
B) potential energy of the spring is converted to kinetic energy of the ball.
 C) no energy is converted either way.
 D) the ball gains more energy than the spring releases.
5. When the ball collides with the block,
 A) momentum is conserved, energy is conserved. **C) momentum is conserved, energy is lost.**
 B) momentum is lost, energy is conserved. D) momentum is lost, energy is lost.

The data shown are for the **elastic** collision on the air track. Both carts have been weighed with the **5cm** flags attached.

m_1 (kg)	t_1 (s)	v_{1f} (m/s)	m_2 (kg)	v_{2i} (m/s)	t_2 (s)
0.150	0.143	0	0.150	0	0.161

6. What is the **momentum** of cart 1 **before** the collision?
 A) 0.0507 kg·m/s C) 0.0556 kg·m/s
B) 0.0524 kg·m/s D) 0.0578 kg·m/s
7. What is the **kinetic energy** of cart 1 **before** the collision?
 A) 0.0069 J B) 0.0086 J **C) 0.0092 J** D) 0.0103 J E) 0.0128 J
8. What is the **momentum** of cart 2 **after** the collision?
 A) 0.0457 kg·m/s C) 0.0485 kg·m/s E) 0.0510 kg·m/s
B) 0.0466 kg·m/s D) 0.0499 kg·m/s
9. What **percent** of the initial kinetic energy is lost?
 A) 0% B) 11% C) 16% D) 19% **E) 22%**
10. If the collision is **perfectly elastic**, how much kinetic energy *should* be lost during the collision?
A) 0% B) 11% C) 16% D) 19% E) 22%
11. For the **perfectly inelastic** collision, if $m_1 = m_2$, you would predict what loss of KE?
 A) 0% B) 25% **C) 50%** D) 75% E) 100%
12. For the **perfectly inelastic** collision, an observation that $t_2 < t_1$ would need to be immediately double-checked, because this should not be possible: **TRUE**