Physics 4A
Spring 2025

Name _____

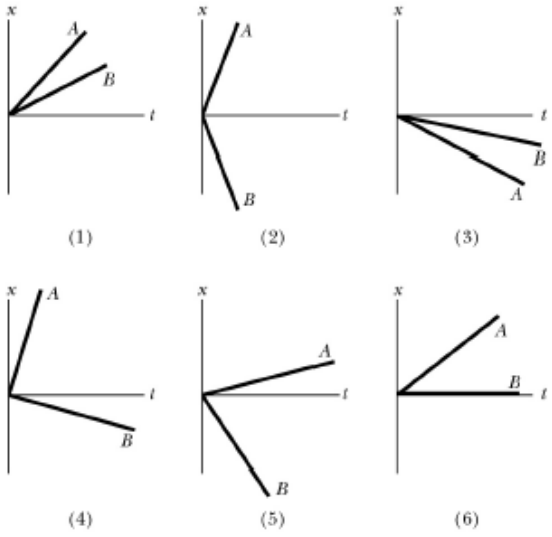
Lab: 8:00 am 11:10 am 2:30 pm (circle one)

Quiz #9: Impulse and Momentum

Problem 1 (2 points)
A stunt person jumps from the roof of a tall building, but no injury occurs because the person lands on a large, air-filled bag. Which one of the following best describes why no injury occurs?

a) The bag provides the necessary force to stop the person.
b) The bag reduces the impulse to the person.
c) The bag increases the amount of time the force acts on the person and reduces the change in momentum.
d) The bag decreases the amount of time during which the momentum is changing and reduces the average force on the person.
e) The bag increases the amount of time during which the momentum is changing and reduces the average force on the person.

Problem 2 (3 points)
An initially stationary box on a frictionless floor explodes into two pieces: piece A with mass m_A and piece B with mass m_B. These pieces then move across the floor along an x axis. Graphs of position versus time for the two pieces are given below.



a) Which graphs pertain to physically possible explosions?

Of those graphs, which best corresponds to the situation in which

b) $m_A = m_B$? **c)** $m_A > m_B$? **d)** $m_A < m_B$?

Problem 3 (5 points)
A 14.5 kg object is traveling at 8.25 m/s to the right and collides with a 6.50 kg object traveling at 5.50 m/s to the left. If the two objects stick together after the collision, how much kinetic energy is lost during the collision?