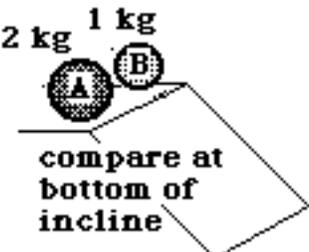


## Unit IX: Test 2

For each of the situations outlined below in questions 1-4 compare ( $a > b$ ,  $a < b$ , or  $a = b$ ) the **momentum** of sphere A and sphere B. Then offer a brief explanation supporting your response.

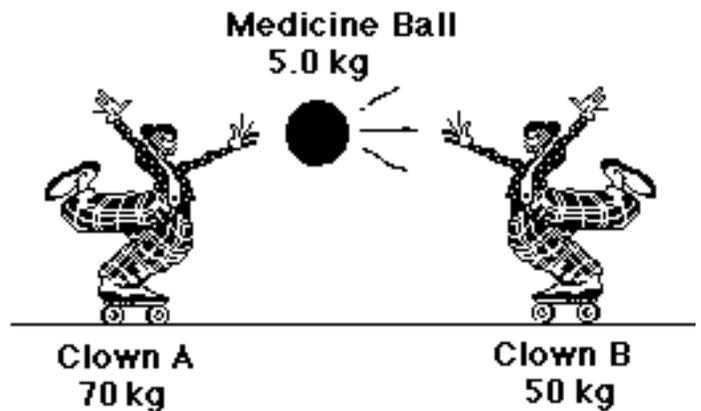
	Situation	Comparison of Momentum	Explanation
1.	2 kg  2 m/s 1 kg  2 m/s		
2.	1 kg  2 m/s 1 kg  4 m/s		
3.	2 kg  1 m/s 1 kg  2 m/s		
4.	2 kg  1 m/s 1 kg  4 m/s		
5.			

- \_\_6. Padded dashboards in cars are safer in an accident than non-padded ones because they
- increase the impact time.
  - decrease the impulse on the occupant.
  - decrease the change in momentum of the occupant.
  - all of the above
  - none of the above

- \_\_7. A 1.0 kg chunk of putty moving at 1.0 m/s collides and sticks to a 5 kg bowling ball that is initially at rest. The magnitude of the momentum of the **ball and putty** after collision is
- more than 5.0 kgm/s.
  - 5.0 kgm/s.
  - 1.0 kgm/s.
  - less than 1 kgm/s.
  - 0.0 kgm/s.
- \_\_8. A golf ball moving forward with a momentum of 1.0 kgm/s strikes and **bounces** backward off a heavy bowling ball that is initially at rest and free to move. The momentum of the **bowling ball** after collision is
- 1.0 kgm/s.
  - more than 1.0 kgm/s.
  - less than 1.0 kgm/s.
  - not enough information provide
  - none of the above
- \_\_9. A bug collides with the windshield of a car traveling down the highway. Which experiences the greater change in **momentum**?
- it depends on the initial velocity of the bug
  - the car
  - the bug
  - both experience the same change
  - none of the above
10. A 150 g baseball is thrown toward home plate with a speed of 40. m/s. The batter hits the ball directly back at the pitcher with a speed of 50. m/s.
- Sketch a motion map to describe the motion of the baseball.
  - What is the *change* in momentum of the ball?
  - If the bat is in contact with the ball for  $6.0 \times 10^{-3}$  s, what is the average force exerted on the ball during the collision?
  - How does the force exerted by the bat on the ball compare to the force exerted by the ball on the bat? Explain.

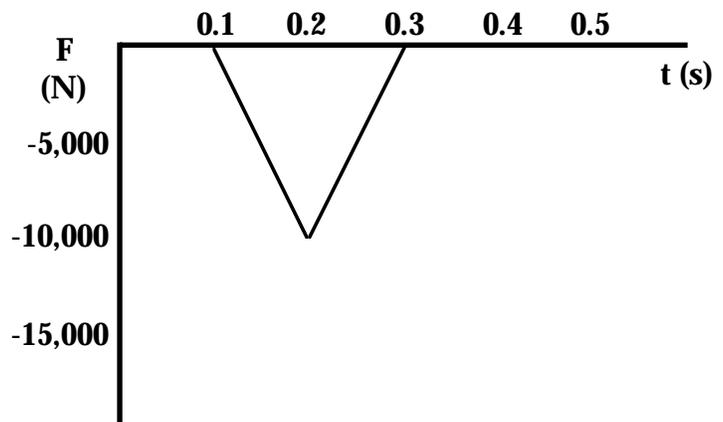
11. An 85.0 kg man, sitting in a 110 kg canoe, catches a 5.0 kg cooler, tossed at 5.0 m/s by a friend.
- Is the collision elastic or inelastic? Explain.
  - What is the final velocity of the canoe?

12. Suppose two clowns on skateboards are standing motionless on a smooth surface 10.0 m apart. Clown B tosses a 5.0 kg medicine ball to clown A. The medicine ball is traveling with a speed of 7.5 m/s.



- What is the resulting velocity of **clown B after throwing** the ball?  
(Be sure to indicate which direction is positive.)
- What is the resulting velocity of **clown A after catching** the ball?

13. At right is the force-time graph for airbag produced by ACME Safety Co. Would this airbag bring a 75 kg man driving at 10 m/s safely to a stop?



Be sure to show work to support your conclusion.