

Momentum

Name _____

Concepts in impulse

- 1) What does Impulse mean?

- 2) What is the impulse – change of momentum equation?

- 3) What three things will change the impulse of a system?

- 4) Explain how “follow through” applies to impulse.

- 5) How does bouncing affect the impulse?

- 6) How does an Airbag work in terms of impulse?

- 7) The Impulse – change in momentum equation is really another way of saying the same thing as a concept that we learned earlier this year. What was that concept?

Concepts in momentum

- 8) What is momentum?

- 9) What does “Conservation of Momentum” mean?

- 10) In chapter we will study four types of collisions, what are they?
 - 1.) _____
 - 2.) _____
 - 3.) _____
 - 4.) _____

- 11) Explain how each collision is different from the other three.

Impulse problems

- 12) How much time will it take a 7.7 kg bowling ball to go from 25 m/s to rest if a force of 100 N is applied?
- 13) What is the change in momentum of a .54 kg baseball that is hit by a bat with a force of 350 N in .03 seconds? If the ball was originally going toward the batter at 60 m/s what will its final velocity be?
- 14) How much force was needed to stop a runaway train that masses 100,000 kg and is initially going at 50 m/s if the conductor has only 4 seconds to stop? Why do trains need a lot of time in order to stop?

Momentum problems

- 15) A Honda Accord (mass = 1500 kg) going 40 m/s collides and sticks to a Buick (mass =2000 kg) going in the same direction but at only 15 m/s. What is their final velocity?
- 16) If a 85 kg student going 4m/s runs into a 60 kg student at rest and after the collision the first student is now going 1.5 m/s what is the speed of the second student?
- 17) Two football players collide head on (one is going one way and the other is going the other way) If the first football player weighs 900 N and is running at 8 m/s and the second football player weighs 700N and is running at 9 m/s, what will the final speed of the pair be after the tackle?
- 18) Sometimes in order to convict a criminal of firing a gun it is necessary to compare the initial velocity of the bullet to known guns. One method of doing this is called a ballistic missile test. In this test a bullet is shot into a piece of wood or other material from different guns and the final speed of the pair is determined. If in this case the mass of the block was 20 kg and the mass of the bullet was .2 kg and their speed after the collision was 3.7 m/s what was the initial speed of the bullet?

Glancing collisions

- 19) If a blob of clay, mass = 2 kg, is moving at 10 m/s and an angle of 30 degrees collides with a second blob of clay, mass = 3 kg, moving at 15 m/s at 90 degrees what is the angle and speed of the combined blob of clay after the collision?