Name: _____ Practice Ph11 2-3

1. A force of 6.0 N acts for 2.3 seconds on mass M. What impulse (in N•s) is given to mass M?

2. Raindrops fall on Brian's head at the rate of 4 drops per second. Each raindrop has a mass of 1.6 mg and falls with a speed of 25 m/s. Assuming that on making contact with Brian's head the drops come to rest and do not rebound, calculate the force felt by Brian.

3. An unbalanced force _____ the total momentum of a system.
   a) does not change
   b) increases
   c) decreases
   d) may increase or decrease, depending on its direction

4. An 8.0 kg ball is given an initial velocity of 10 m/s and then is allowed to roll along a floor. A frictional force of 2.0 N opposes its motion. For what length of time will it roll before stopping?
   a) 40 s
   b) 0.025 s
   c) 0.25 s
   d) 1.6 s
   e) 2.5 s

5. Impulse can be represented by
   a) mv
   b) $\Delta v/\Delta t$
   c) $F\Delta t$
   d) none of these

6. The time needed for a net force of 10.0 N to change the velocity of a 5.0 kg mass by 3.0 m/s is
   a) 1.5×10^2 m/s
   b) 6.0 s
   c) 1.5 s
   d) 16.7 s

7. A 1000 kg car moving at 10 m/s strikes a stone wall and is brought to a halt is 0.100 s. The average force of the car on the wall is
   a) 100 000 N
   b) 10 000 N
   c) 1 000 N
   d) 10 N

8. If an object moving at a rate of 20 m/s collides with a stationary object and the two objects move away together, the velocity of the combined objects will be
   a) 10 m/s
   b) greater than 20 m/s
   c) less than 20 m/s
   d) 20 m/s

9. A Ping-Pong gun, initially at rest, fires a ball. After the shot, the sum of the gun's and ball's
   a) momenta is zero
   b) masses is zero
   c) accelerations is zero
   d) velocities is zero

10. Two dynamics carts, on a frictionless surface, are blasted apart by the spring between them.

If cart B moves off at + 5.0 m/s, what is the velocity of cart A (in m/s)?

11. What is the recoil velocity (in m/s) of a 4.0 kg rifle that shoots a 0.050 kg bullet at a speed of 280 m/s? Enter your soliution in m/s in the box below.

12. A moving freight car runs into an identical car at rest on the track. The cars couple together. Compared to the velocity of the first car before the collision, the velocity of the combined cars after the collision is
   a) the same
   b) twice as great
   c) zero
   d) one-half as great

13. A neutron (1 unit of mass) has a velocity of **V**. It collides with a helium nucleus (4 units of mass) which was at rest. After the collision the helium nucleus moves off at 1/2 **V**. What is the velocity of the neutron after the collision?
   a) – 1.0 V
   b) 0.4 V
   c) – 0.60 V
   d) 1.2 V

14. Bullets are fired from an airplane in the forward direction of motion. Assuming that the gun is mounted onto the airplane, the momentum of the airplane would be
   a) increased
   b) decreased
   c) unchanged

15. When a golf club hits a golf ball, the change in velocity of the ball is _____ that of the club.
   a) less than
   b) equal to
   c) greater than
   d) not enough information to answer

16. A toy car X of mass 0.200 kg moves along a frictionless surface with a velocity of 0.180 m/s. It collides with another toy car Y, with a mass of 0.250 kg and a speed of 0.130 m/s in the same direction. After the collision, toy car X continues to move in the same direction with a velocity of 0.177 m/s. Calculate the speed of toy car Y after the collision.