Problems

Name _____

ON A SEPARATE SHEET OF PAPER, solve the following energy and momentum problems using the definitions of energy and momentum or the conservation of energy and momentum.

- 1. What is the momentum of a 30.0 kg shell fired form a cannon with a velocity of 500 m/s?
- 2. What is the momentum of a 8.8 lb bowling ball with a velocity of 7.0 m/s?
- 3. A 30.0 kg shell is fired from a 2000 kg cannon with a velocity of 500 m/s. What is the magnitude of the recoil velocity of the cannon?
- 4. An 80.0 kg man is standing on a frictionless ice surface when he throws a 2.0 kg book at 10.0 m/s. What is the magnitude of the recoil velocity of the man after throwing the book?
- 5. How much work is done when a force of 800.0 N is exerted while pushing a crate across a level floor for a distance of 1.5 m.
- 6. A force of 400.0 N is exerted on a 1250 N car while moving it a distance of 3.0 m. How much work was done on the car?
- 7. A 5.0 kg textbook is raised at a constant velocity a distance of 30.0 cm as a student prepares to leave for school. How much work did the student do on the book?
- 8. What is the kinetic energy of a 30.0 g bullet that is traveling at 200 m/s?
- 9. A force of 50.0 lb is used to push a box 10.0 ft **across** a level floor:
 - (a) How much work was done on the box?
 - (*b*) What is the change in potential energy of the box?
- 10. A 50.0 kg crate is moved a distance of 1.5 m **above** a storeroom floor at a constant velocity:
 - (*a*) How much work was done on the crate?
 - (*b*) What is the change in potential energy of the crate?
 - (*c*) How much kinetic energy would the crate have just before hitting the floor if it fell?
- 11. A 1500 kg car is traveling with a constant velocity of 72.0 km/h.
 - (a) What is the kinetic energy of the car?
 - (*b*) How much work must be done on the car to bring it to a complete stop?
- 12. Compare the kinetic energy of an 800 kg car moving at 20.0 m/s to the kinetic energy of a 1600 kg care moving at the same speed.
- 13. A ball is dropped from 20.0 ft above the ground.
 - (*a*) At what height above the ground are the kinetic and potential energies equal?
 - (*b*) Using conservation of energy, determine the velocity of the ball just as it hits the ground.