

- 5 kg m/sec 1. What is the momentum of an ball that has a mass of 500 grams and is travelling at a speed of 10 m/sec?
- 3 N sec 2. What is the impulse of the ground if it creates a force of 10 N in .3 sec?
- 30 m/sec 3. If the ground above strikes a ball that has a mass of 100 grams, then what is the change in velocity of the ball?
- 4.9 kg m/sec,  
.675 m/sec 4. A baseball, mass 140 grams, is moving at +35 m/sec. A) Find the momentum. B) Find the velocity of a bowling ball, mass 7.26 kg, that has the same momentum.
- 10.64 N sec,  
 $1.33 \times 10^4$  N,  
 $9.5 \times 10^4$  m/sec<sup>2</sup> 5. A baseball, mass .14 kg, is travelling at a velocity of +38 m/sec. After it is hit by a bat, it has a velocity of -38 m/sec. A) What impulse did the bat deliver to the ball? B) The bat and ball were in contact for .8 msec. What force did the bat exert on the ball? C) Find the acceleration of the ball while the bat and ball were in contact.
6. In the book: Chapter 9 Practice Problems #1, 2, 3, 5, 6, 7, 10, 11, 13, 14
- Honors only 7. Chapter 9 Practice Problems #4, 8, 12, 15
8. Joe strikes the cue ball, mass .16 kg, and gives it a velocity of 4 m/sec. It strikes the stationary 8 ball, mass .17 kg. The cue ball bounds off at an angle of 30 °with the horizontal. A) What angle does the 8 ball bound off? B) Draw a picture of this situation. C) Find the momentum of the cue ball before the collision. D) Find the total momentum after the collision.
- Honors only 9. What is the velocity of each ball after the collision?
- 200 m/sec 10. A bullet of mass 5 gm is fired into a stationary block of wood, mass 5 kg. The velocity of the block and the imbedded bullet is 20 cm/sec after impact. What was the velocity of the bullet?
- .738 m/sec 11. A bullet, mass 6 gm, is fired from a gun, mass 5kg, with a speed of 615 m/sec. What is the recoil speed of the gun?
- 5 m/sec 12. A 1 kg ball, velocity 8 m/sec southward, collides with a 2 kg ball travelling with a velocity of 3 m/sec southward. If the velocity of the 2 kg ball after impact is 4.5 m/sec southward, then what is the velocity of the other ball? Be sure to include direction!
- .75 m/sec 13. A steel ball with a 100 gm mass and a speed of 300 cm/sec strikes a 300 gm ball which is stationary. A piece of putty on the smaller ball makes the two balls stick together. What is the speed of each ball after the collision?
- 1.5 m/sec 14. The piece of putty in the problem above is removed. After impact, now the 100 gm ball bounces back with a speed of 150 cm/sec. Find the speed of the 300 gm ball.
15. In the book: pg. 192-3; RC #1, 3, 4, 5, 8, 9; AC #2, 3, 8, 9, 10, 11; pg. 195 Thinking Physic-ally
16. In the book: Chapter 10 Practice Problems #1, 2, 3, 4, 5, 6, 7, 9, 10, 11
17. An object produces a work output of 12 J. If the work input is 15 J, then what is the efficiency of this machine? What is wrong with this problem?
- 38 J 18. A waitress picks up a tray of food, mass 1.5 kg, and moves it through a vertical distance of 2.5 meters. What is the work she did?
19. A waitress carries a tray of food, mass 1.5 kg, horizontally for 5 meters. What is the work that she did?
20. In the book: pg 212-213; RC #2, 3, 4, 6; AC #1, 3, 4, 5, 6\*
21. In the book: Chapter 11 Practice Problems #1 omit d, 2, 3, 5, 6, 7, 9, 10, 11, 14, 15
- Honors only 22. In the book: Chapter 11 Practice Problems #4, 8, 16
23. In the book: pg. 236-7; RC #1, 5, 7, 10, 12, 14, 15; AC #1, 2, 3, 6, 11, 13\*, 14\*

- 10% 24. A car receives 1000 J of energy in fuel. If 100 J of work make the car move, what is the efficiency of the car?
- 39 m/sec, 4 sec,  
384 J 25. A rock, mass 500 gm, falls in a vacuum that is 78.4 m high. If the potential energy at the bottom is zero, then A) what is the velocity as it hits the bottom? B) How long does it take to hit the bottom? C) What is the kinetic energy of rock as it hits the ground?
- 172 J, 178 J 26. Find the potential energy of a ball, mass 350 gm, that is 50 meters above the ground. What is the potential energy if I raise the ball up another 2 meters?
- $1.5 \times 10^{10}$  J 27. How much work (in kW hours) does a 25 kW water pump do if it runs steadily for one week?
- $5 \times 10^4$  watts 28. What is the power of a bulldozer that does  $5.5 \times 10^4$  J of work in 1.1 sec?
- 660 watts 29. How much power is developed by a 60 kg boy running up a 4.5 m high flight of stairs in 4 sec?
- 2 J 30. A 2 kg hockey puck is accelerated at a rate of  $5 \text{ m/sec}^2$  for .5 m across the frictionless ice. What is the work that is done?