Ph 11
Apr 94

Name:_____

More to Work On

g = 9.80 N/kg

PART A: Short Questions:

Give an equation, show substitution, use correct units in answer

1. How much work is done when a 200 N force is used to slide a 30 kg trunk 6.0 m across a room?

1._____

2. A person on a bicycle produces a forward force of 200 N and is travelling 3.0 m/s. What power is being produced?

2._____

3. What power is needed to lift a 1000 kg load 20 m to the top of a construction site in 1.0 minute?

3._____

4. A 1500 kg car accelerates from rest at 2.0 m/s^2 for a distance of 250 m. Neglecting friction, how much work was done in accelerating the car?

4._____

5. When the acceleration is over, what is the kinetic energy of the car in the previous question?

5._____

6. A 150 W motor is used to raise a garage door. If the average force needed to lift the door is 600 N, how much time will it take to raise the door 2.5 m?

6._____

7. What is the potential energy stored in a cubic meter of water (=1000 kg) that is in a reservoir behind a dam at a height of 60 m above the elevation of the turbines the water will be used to turn?

7._____

8. In an experiment, a small 20 W motor is used to lift a 100 g mass through a vertical distance. If the motor runs for 40 s, how much potential energy does the mass gain?

8._____

9. What is conserved during an elastic collision?

9._____

10. Mr. W's home with electric heating uses an average of 4000 kWh of electricity per month. How many joules of energy is this?

10._____

11. A 200 g mass rests on a table 2.0 m above the floor. If the mass slips off the table what is its kinetic energy just as it reaches the floor?

11._____

12. What is the kinetic energy of a 1200 kg car travelling 90 km/h?

12._____

13. What unit is equivalent to a J/s?.

13._____

PART B: Problems.

14. A 200 W motor runs a pump to move water from a stream into a storage tank 10 m above the elevation of the stream. How many litres of water can the pump move in 1.0 hour? (recall that 1.0 L of water = 1.0 kg)

15. A pendulum bob is raised in an arc to a position 20 cm higher than its lowest point. The bob is released. What is the speed of the bob as it passes through its lowest point?

16. A 10 g bullet travelling at 300 m/s imbeds itself into a stationary 1000 g block of wood. After impact the block has a speed of 3.0 m/s. How many joules of heat and sound energy was produced?

17. Car travelling at 10 m/s rolls down a steep driveway that has a vertical drop of 5.0 m. Ignoring friction, what is the car's speed at the bottom of the incline?

18. A 500 g piece of copper is heated to 200 °C and dropped into 250 g of water at 20 °C. To what temperature is the water heated, ignoring heat lost to the surroundings?
Specific heat of copper = 390 J/kg°C
Specific heat of water = 4200 J/kg°C