**Physics 11 – Class Assignment – Work, Energy and Power**

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Calculate the potential energy of a rock with a mass of 55 kg while sitting on a cliff that is 27m high.
2. What distance is a book from the floor if the book contains 196 Joules of potential energy and has a mass of 5 kg?
3. An automobile is sitting on a hill which is 20 m higher than ground level. Find the mass of the automobile if it contains 362,600 J of potential energy.
4. Calculate the kinetic energy of the rock in problem #8 if the rock rolls down the hill with a velocity of 8 m/s.
5. Calculate the kinetic energy of a truck that has a mass of 2900 kg and is moving at 55 m/s.
6. Find the mass of a car that is traveling at a velocity of 60 m/s North. The car has 5,040,000 J of kinetic energy.
7. How fast is a ball rolling if it contains 98 J of kinetic energy and has a mass of 4 kg?
8. At what height is an object that has a mass of 16 kg, it its gravitational potential energy is 7500 J.
9. A book with a mass of 1 kg is dropped from a height of 3 m. What is the potential energy of the book when it reaches the floor?
10. What is the mass of an object if its gravitational potential energy is 3822 J and it is 15 m above the ground?
11. A shopper in a supermarket pushes a cart with a force of 35 N directed at an angle of 25 degrees downward from the horizontal. Find the work done by the shopper on the cart as the shopper moves along a 50 m length of aisle.
12. How much power does it take to lift 30.0 N 10.0 m high in 5.00 s?
13. How much power does it take to lift 30.0 kg 10.0 m high in 5.00 s?
14. A 60 watt light bulb runs for 5.0 seconds. How much energy does it use?
15. How much work can a 22 kW car engine do in 60 s if it is 100% efficient?
16. How much electrical energy (in kilowatt-hours) would a 60.0 W light bulb use in 60.0 days if left on steadily?
17. What is the specific heat capacity of a material if 2000 J of heat energy can raise the temperature of 10 g of it by 140oC?
18. How much heat energy is needed to raise the temperature of 50 g of lead by 4.0oC?
19. You do 45 J of work in 3.0 seconds. How much power do you use?
20. A car uses 2,500 Joules in 25 seconds. Find power.
21. Gold has a specific heat of 0.129 J/(g×°C). How many joules of heat energy are required to raise the temperature of 15 grams of gold from 22 °C to 85°C?
22. If the temperature of 34.4 g of ethanol increases from 25 °C to 78.8 °C, how much heat has been absorbed by the ethanol? The specific heat of ethanol is 2.44 J/(g×°C)
23. Graphite has a specific heat of 0.709 J/(g×°C). If a 25 gram piece of graphite is cooled from 35 °C to 18 °C, how much energy was lost by the graphite?
24. Copper has a specific heat of 0.385 J/(g×°C). A piece of copper absorbs 5000 J of energy and undergoes a temperature change from 100 °C to 200 °C. What is the mass of the piece of copper?
25. A 40 g sample of water absorbs 500 Joules of energy. How much did the water temperature change? The specific heat of water is 4.18 J/(g×°C).
26. If 335 g of water at 65.5 °C loses 9750 J of heat, what is the final temperature of the water? Liquid water has a specific heat of 4.18 J/(g×°C).