Work, Power and Energy Review

1) What is the work done when pulling a mass with a force of 25 N a distance of 10m?

2) How much work is done if a 15 kg object is lifted 2.0 meters off the ground?

3) What is the power used by a student whose mass is 75 kg and runs up 3.0 m in 4.2 s?

4) How long does it take a 100 watt light bulb to consume 75 Joules of energy?

5) How much energy is required to lift a 50 kg mass up to a height of 50 m from (a) the ground and (b) 30 m?

6) What is the kinetic energy of a 50 gram bat flying at 6.0 m/s?

7) What is the total energy of the bat above if it is at a height of 15 m?

8) If the bat above is shot and falls what would be its velocity at the ground?

9) A cat is dropped from a height of 15m, calculate its velocity when it hits the ground and show that its mass is not important.

10) A 150 gram arrow is shot straight up from a bow at a velocity of 20 m/s from a height of 1.5 m, to what maximum height will the arrow climb?

11) In the question above the arrow was seen to rise only to a height of 17.34 m. Explain why the law of conservation of energy was not violated.

12) Calculate the efficiency of the arrow above.

13) A rollercoaster has a maximum height of 50m on the first hill, the cars then drop 30 m and then rise 10 m to the top of the second hill. Calculate the speed of the cars at the top of the second hill (assume they left the first hill with V_o = 0 m/s. Assume 100% efficiency.

14) A ball of mass 500 grams falls from height 5.0 m and bounces up to a height of 4.0 m what was the efficiency?

15) If a ball is thrown down at 14.0 m/s from 5.0 m to what maximum height could it bounce? Assume 100% efficiency.