PHYS 1401 General Physics I
Homework #12

This homework is different from the previous ones. It's more intended to get you reading material in Chapter 15 and 16 which we might not have too much of a chance to cover in class. Answer all the questions below. For computation problems, don't forget to express answers in complete sentences with proper units and significant figures!

1. (2 points) Do Problem 68 on page 461. Some hints:

    a) Recall that power = work done / time, and that a food calorie is 4146 J.
    b) Note what percentage is turned into heat.
    c) Remember that water has a density of 1000 kg / cubic meter, and there are 1000 Liters in a cubic meter.

2. (2 points) Do Problem 66 on page 498. Note that "gauge pressure" means the reading on the tire gauge, is the actual pressure inside the tire minus the atmospheric pressure outside the tire.

3. (3 points) State *in your own words* the first two Laws of Thermodynamics. Do **not** quote passages from the book!

4. (1 point) Explain in common everyday language why we can never have a completely efficient engine.

5. (1 point) Given what "temperature" means, what would it mean for the molecules of a substance to be at "absolute zero" temperature? Justify your answer in terms of energy.

6. (1 points) Do Problem 4 on page 525.