PHYSICS-2

Elementary Physics of Energy

Homework 1

Due Date: APRIL 13, 2012 in class

Problems similar to those on page 28 of Ristinen and Kraushaar: (there are a few details that differ from the book in some questions, so read the questions carefully)

1. What are the two major problems created by depending on fossil fuels for most of our energy?

3. If you push a cart along a horizontal surface with a force of 10 pounds, and the cart moves 10 feet, how much work have you done in ft·lbs? In joules? Since energy is conserved, where has the above energy gone? Where did it come from?

8. A bicyclist on a flat road expends energy at a rate of 80 watts. How many calories of energy are expended in five minutes of pedaling?

10. Solar energy is incident on a black parking lot with an intensity of 1000 $\frac{W}{m^2}$ and 90% of it is absorbed. What is this in Btu/hr per square meter? What happens to the other 10%?

11. A windmill produces 1400 watts of electric power that is used to heat water. The efficiency is 80.% How much useful energy is produced in 24 hours in units of Btu and Joules?

12. Assume that the population of the US increases by 1%/yr. How many Btu will have to be added to the energy budget to maintain the same per capita expenditure? What is this in barrels of oil, and in tons of coal?

Multiple choice questions on pg. 29-30:

(Questions are from the book, just give the answer, e.g. in 1. you may choose e. as the solution if that is what you think is right.)

1.
2.
4.
5.
7.
11.

13.