Concepts of Science   **NAME**_____
Exam 3 March 10, 1997   **Class Time**_____   **Lab Sec.**_____

When Solving Problems, be sure to show all work
1. I often listen to Peach State Public Radio which broadcasts at a frequency of 88.1 cycles/sec. Calculate the wavelength of these radio waves. (10%)
2. a. Write equations showing how ozone is generated in the upper atmosphere. (5%)
b. Write equations showing how CF_2Cl_2 acts to distroy the ozone in the upper atmosphere. (5%)
3. Calculate the mass of a 100 kg man travelling 90% of the speed of light. (10%)
4. Fill in the blanks in the sentences below with one of the words in the word list on the last page. These words can be used more than once. (40%)
a. The main source of bodily energy is _____
b. Studies show that atmospheric carbon dioxide concentration is

_____
c. Light Energy increases with _____
d. Much acid rain comes from _____ produced by burning coal
e. _____ energy results from the conversion of mass into energy
f. Commercial nuclear reactors are _____ reactors.
g. Scientists think the Earth is about _____ years old.
h. In 1953,_____ carried out experiments related to the

origin of life.i. In a biological sense, _____ is a change in the genetic content of a population with time.
j. The three main layers of the atmosphere are (as altitude increases): the _____,the _____ and the _____.
k. _____is often referred to as Nature's sunscreen.
l. _____was an early geologist who influenced Darwin
m. The _____is the visible characteristic of an organism
n. In a demonstration in class, we used _____ to collapse a bunch of baloons.
o. Genes are made up of _____
p. Recently a _____ was cloned from an adult _____
5. Each of the statements below is false. Briefly correct each one (20%)
a. The theory of evolution states that we are descended from monkeys

b. Nuclear power has essentially no problems associated with it.

c. We don't have to worry about running out of fossil fuels, we can just make more.

d. Chlorine from CFCs can't be dangerous to the ozone layer becaus chlorine from swimming pools is not.

6. Briefly distinguish between basic and applied research. Give an example of each. (10%)

Word List:

increasing, high, low, causing global warming, solar, nuclear, carbon dioxide, glucose, increasing, DNA goat, bear, pressure, liquid nitrogen evolution, Watson and Crick, RNA, fission, causing global warming, ATP, fusion, dangerous, 4.5 billion, genotype, three million, ten thousand, gasoline, coal, hydrogen, troposphere, decreasing, stratosphere, mesosphere, ozone, sulfur dioxide, Gregor Mendel, proteins, hot water, Thomas Malthus, Bishop Ussher, Alfred Russell Wallace, wavelength, red shift, quantum mechanics, Charles Lyell, phenotype, human genome, frequency, AIDS, Stanley Miller, F. S. Rowland, oxygen, cloning, chromosomes, heat, intensity, bacteria, virus.

Useful Information:

Meter = 39.37 inches = 1.094 yards   Quart = 0.9463 liter
Yard = 0.9144 meter   Pound = 0.453 kilograms
Mile = 1.609 kilometers   Ounce = 28.53 gram
Inch = 2.54 centimeter

$KE = 1/2\ mv^2$; $PE = mgh$; where $g = 9.8$ meter/sec^2

$c = \lambda v$; where $c = 3 \times 10^8$ meter/sec; $E = mc^2$; $E = h v$

Relativistic mass: $m = \dfrac{m_0}{\sqrt{1 - \dfrac{v^2}{c^2}}}$ Relativistic length: $l = l_0 \sqrt{1 - v^2/c^2}$

Relativistic time: $\tau = \dfrac{\tau_0}{\sqrt{1 - \dfrac{v^2}{c^2}}}$