Thermodynamics Quiz

1. What is temperature a measure of?

2. 3 moles of gas have a kinetic energy of 2500 Joules. What is the temperature of the gas? Express your answer in Celsius.

3. A piston has a radius of .2m and is at a height of 1m. The piston is in a cylinder filled with 10 moles of a gas. The gas has a mass of 10^{-4} grams. The system is isobaric. The initial temperature is 200 F. If the piston is allowed to fall from rest, find the temperature of the system at each second for the first 5 seconds of the fall. Find the kinetic energy for the first 5 seconds. Also find the speed of the gas at each second for the first 5 seconds.

4. A piston with a radius of .45m is at a height of .3m. If a gas has a mass of .0025kg and is at a pressure of 96000 Pascal, what is its velocity?

5. A mole of gas with a mass of .75g is in a container. How hot does the container have to be for the gas to move at the speed of light?

6. The temperature of a system with one mole of gas is decaying as a function of time. The function f(t) is given as $T(t)=T_o e^{-.25t}$. If the initial temperature is 67F, what is the kinetic energy of the system at t=0? How long will it take for the kinetic energy of the system to be cut in half?