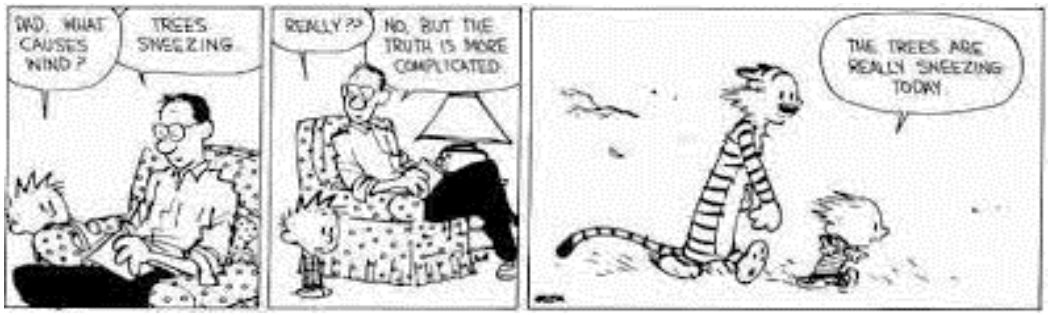
AP 2 Thermodynamics WS 2

Name: _____ Period: _____



What we normally consider to be impossible are simply engineering problems… there's no law of physics preventing them – Michio Kaku

1. A scuba tank contains 2.35 L of air at 22.1°C and 1.00 atm. What is the pressure in the tank if the temperature is increased to 128°C?

2. The rms speed of the molecules in a gas is 600 m/s. What will the rms speed if the gas pressure and volume are both halved?

3. At STP, what is the total translational kinetic energy of the molecules in 1.0 mol of a) hydrogen, b) helium, c) oxygen?

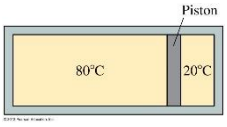
4. What are the rms speeds of the 3 types of molecules in question 3?

5. A gas at 100°C fills volume V_0. If the pressure is held constant, what is the volume if (a) the Celsius temperature is doubled and (b) the Kelvin temperature is doubled?

6. A rigid container holds 2.0 mol of gas at a pressure of 1.0 atm and a temperature of 30°C. a) What is the container's volume? b) What is the pressure if the temperature is raised to 130°C ?

7. What happens to the temperature of a gas if the speed of every molecule increases by a factor of 2?

8. The cylinder in the figure is divided into two compartments by a frictionless piston that can slide back and forth. Is the pressure on the left side greater than, less than or equal to the pressure on the right? Explain.



9. A 10m x 14 m house is built on a 12 cm thick concrete slab. What is the rate of heat loss through the slab if the ground temperature is 5°C while the interior temperature is 22°C?

10. The two ends of a 20 cm long rod with a diameter of 2 cm are placed in ice water and boiling water respectively. The result is a temperature difference between the ends of 100°C. If heat is conducted through the rod at a rate of 4.5×10^4 J per hour. What is the thermal conductivity of the material?