Name: _____

# Physics 202 Exam 1

May 1, 2013

## Word Problems

Show all your work and circle your final answer. (Ten points each.)

**1.** If 2.4 $m^3$ of a gas initially at STP is compressed to 1.6 $m^3$ and its temperature raised to 30 °C, what is the final pressure?

**2.** What is the average speed of the molecules in low-density oxygen gas at 0 °C? (The mass of an oxygen molecule, $O_2$, is $5.31 \times 10^{-26}$ kg.)

**3.** A popgun uses an ideal spring for which $k = 2000$ N/m. When cocked, the spring is compressed 3.0 centimeters. How high can the gun shoot a 5.0-gram projectile?

**4.** A platform is suspended by four wires at its corners. The wires are 3.0 meters long and have a diameter of 2.0 millimeters. Young's modulus for the material of the wires is $1.8 \times 10^{11}$ N/m$^2$. How far will the platform drop (due to elongation of the wires) if a 50-kilogram load is placed at the center of the platform?

**5.** A molten plastic flows out of a tube that is 8.0 centimeters long at a rate of 13 $cm^3$/min when the pressure differential between the two ends of the tube is 0.24 atm. Find the viscosity of the plastic. The inner diameter of the tube 1.30 millimeters.

**6.** Determine the temperature that results when 1.0 kilograms of ice at exactly 0 °C is mixed with 9.0 kilograms of water at 50 °C and no heat is lost.