Vasquez High School -- Chemistry -- S'15 Exam #4 -- Chapter 13 -- 85 points

Write TRUE if the statement is true OR write the word(s) that substitute for the underlined word(s) that would make it true. Writing false ony earns partial credit. Three points each.

_____ 1) Consider a sample of oxygen collected over water. To get the pressure of just the oxygen, we would subtract the vapor pressure of the water. This is an example of Dalton's Law.

_____ 2) The egg getting sucked into the flask was a clear demonstration of Boyle's Law.

_____ 3) Standard temperature and pressure is 0 K and 1 atm.

_____ 4) When doing gas stoichiometry, we are not normally asked for how many grams of gas are produced, but how many liters of gas are produced.

_____ 5) The combined gas law with pressures remaining constant reduces to Charles' Law.

Short Answer/Fill-in. Be neat and complete. Three points each.

6) Consider the ideal gas law PV = nRT. What must the units of R be? _____

7) The molar volume of chlorine gas at STP is _____.

8) Boyle's Law states that if the pressure of a gas is doubled, then the volume of it must be _____.

9) The formula for the kinetic energy of a particle indicates that if the energy of the particle is increased by a factor of four, then the speed of the particle _____ by a factor of _____.

10) Equal volumes of gases at the same temperature and pressure contain an equal number of particles is one way of expressing _____.

Longer Answer. Be clear and neat and be sure to read what you wrote before turning it in. Five points each.

11) Describe how you can use the kinetic theory of gases to show how an increase in the temperature of a gas increases the pressure of that gas.

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Calculation/Diagram Section. Write the formulas. Show your work. Write the units if needed. SEVEN points.

12) A sample of gas having a volume of 14.3 L has a pressure of 1.15 atm at 20 °C. How many moles of gas are present?

13) Consider the four gases, Br_2, Cl_2, CO_2, and NH_3. Rank them from fastest to slowest, AND determine the ratio of the average speed of the fastest gas to the average speed of the slowest one.

14) A balloon containing 678 L of air has a pressure of 730 torr. If the volume is kept constant and the volume is reduced to 322 L, what will the new pressure be, in torr?

15) A sample of xenon hexafluoroplatinate gas, $XePtF_6$, has a pressure of 870 mmHg at a temperature of 63 °C. Its vessel has a volume of 48.5 L. If we expand the gas to a volume of 59.2 L while reducing the temperature to 309 K, what will the new pressure be in mmHg?

16) Consider that 3 moles F_2, 4 moles Cl_2, 5 moles Br_2, and 7 moles I_2 are all in the same large vessel that has a total pressure of 1350 torr. What are the partial pressures of each of the gases in that vessel?

17) 125g of pentane, C_5H_{12}, is burned in oxygen to produce the normal combustion products. What volume of carbon dioxide is produced at 67.0 °C and 1.32 atm?

18) Draw both the graphs of Boyle's Law and of Charles' Law with all axes labelled. Four points.

21) Recall the demonstration of the newspaper covering the meter stick. For four points, state how many pounds of air were on top of the newspaper if it measured 22" x 28".