

Vasquez High School -- AP Chemistry -- Exam #5 -- Chapter 5 -- 75 points

In memory of our comrade Carl, we dedicate your success on this exam. May he find happiness in that other school to which he has ventured...in other words, show all your work and be neat and complete!
Five points each unless specified otherwise.

1) In a lab, you observe a 50 L cylinder of gas to be at 4.5 atm and 315 K. How many molecules of gas are present within the cylinder?

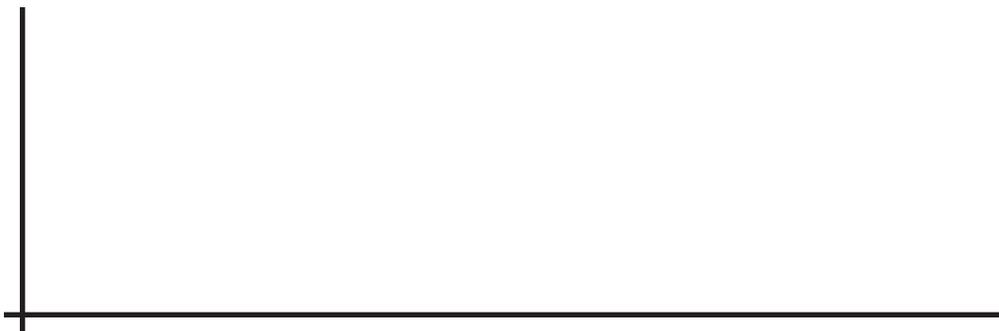
2) The Haber process is one which produces ammonia gas, NH_3 , by combining hydrogen gas with nitrogen gas. You are given 1000 L of each of the reactants at STP. How many liters of ammonia will be produced at 100 °C and 3 atmospheres pressure? Ten points on this one.
(Hint: Remember limiting reagents?)

3) An elemental gas has a density of 3.741 grams per liter at STP. What gas is that? (This will make up for the harder problem on #2...but you have to show your work...no guessing!)

4) Draw graphs of pressure (y-axis) vs. volume (x-axis) and volume (y) vs. absolute temperature (x) for ideal gases below



- 5) On a deserted mining colony on Mars, you have been assigned...oh wait, did that already...a cylinder of hydrogen sulfide (H_2S) gas containing 350 L is at 25 °C and 2.75 atm pressure. A plunger decreases the volume to just 120 L. You notice the new temperature is 55 °C. What will the new pressure be?
- 6) Calculate the ratio of the relative speeds between helium gas and sulfur hexafluoride (SF_6) gas at the same temperature.
- 7) Draw an approximate graph for the Maxwell probability distribution of gas velocities, designating both axes and the most probable velocity for any given temperature.



- 8) State the ideal gas law: _____ Then name the two corrections and describe why they must be included for a more accurate representation of gas behavior: _____

Multiple Choice. Write the letter that best answers each example. Be careful and think them through.

_____ 9) Which is not a feature of the kinetic model/theory of gases?

- a) The particles in a gas are considered to be small, hard spheres with insignificant volume.
- b) The motion of the particles in a gas is varied in its magnitude, constant direction, and random.
- c) All collisions between particles are considered to be perfectly elastic.
- d) All are features of the kinetic model/theory.

_____ 10) If we raise the temperature of a gas and increase the pressure as well, what happens to the volume?

- a) It increases.
- b) It decreases.
- c) One cannot tell; it depends on how much each increase was.
- d) It does not change.
- e) It depends on how many moles were present.

_____ 11) The reason why you're never supposed to hold your breath when SCUBA diving using compressed air tanks is

- a) A full set of lungs will explode if you descend (go down) too quickly.
- b) A full set of lungs will explode if you ascend (go up) too quickly.
- c) The nitrogen will escape out of your blood causing you "the bends" if you don't exhale.
- d) The SCUBA apparatus will not function properly if you don't breathe regularly thru it.

_____ 12) You often see the warning, "Do not incinerate (burn)" on aerosol cans, because they are liable to explode if you do. This would be an example of

- a) Graham's Law
- b) Boyle's Law
- c) Charles' Law
- d) Combined Gas Law

_____ 13) In a mixture of gases, Dalton says that the total pressure is the _____ of the partial pressures of the gases making up the mixture.

- a) difference
- b) sum
- c) product
- d) inverse square root

14) When coal is burned, the sulfur present in coal is converted to sulfur dioxide, which is responsible for the acid rain phenomenon. If 19.46 kg of sulfur is reacted with excess oxygen, calculate the volume of SO_2 formed at 36 °C and 745 mm Hg.