SI:

Chapter 11

1. State the physical properties of a gas:
   a. No definite shape or volume
   b. Highly compressible
   c. Low densities
   d. Exert uniform Pressure on walls of a closed cont.
   e. Mix spontaneously and completely at constant pressure
2. What does the Kinetic molecular theory of gases state?
   a. Gas particles move continuously in straight lines
   b. Gas particles are tiny, w/ great dist. between them
   c. Both gravitational Forces + Forces of attraction is negligible
   d. When collide- no energy is lost
   e. Average kinetic energy is same for all gases at the same temp. kinetic energy inc. w/ Temp
3. Pressure Units:

1Pa=	1 N/M^2
1atm=	101,325 Pa
1atm=	14.7 Psi
1torr=	1 mmHg

4. Boyle's Law:
   a. At constant temp the vol of a gas sample is inversley proportionate to the Pressure of the gas sample.
   b. What is the formula for Boyle's Law?

$$P_1V_1 = P_2V_2$$

5. Charles L
   a. At
   pr
   b. W
6. Gay- Luss
   a. At
   pr
   b. W
7. What is th
   P_1V
8. Avogadro
   a. Th
   Proporti
   b. W
   U
9. Define ST
   a.

key:

5. Charles Law:
   a. At constant Pressure the Vol of a gas sample is Directly proportionate to it's Kelvin Temp.
   b. What is the formula for Charles law?

$$V_1 T_2 = V_2 T_1$$

cont.

6. Gay- Lussac's Law:
   a. At constant Vol the Pressure of a gas sample is directly proportionate to it's Kelvin Temp.
   b. What is the formula for Gay- Lusacc's law?

$$P_1 T_2 = P_2 T_1$$

7. What is the formula for the combined gas law?

$$P_1 V_1 / T_1 = \frac{P_2 V_2}{T_2}$$

8. Avogadro's Law:
   a. The Vol of a gas sample at constant Temp and Pressure is Proportionate to the number of Moles of the gas.
   b. What is the formula?

$$V_1 n_2 = V_2 n_1$$

9. Define STP
   a. 1atm at 273K

10. What is the molar volume of any gas at STP?

a. 22.4 L.

11. Ideal Gas Law:

a. Formula:

$PV = nRT$ $R = 0.0821$

12. Calculate the number of moles of ammonium gas NH3 in a volume of 55L of the gas measured at STP.

Vol of gas = n x 22.4 L/mol

55L = n x 22.4 L/mol

= 2.46 mols.

Math:

1. Convert 105 Psi to atm:

a. $\frac{105\ psi}{14.7\ psi} \times \frac{1\ atm}{} = 7.14\ atm$

2. Convert 945 Torr to psi:

a. $\frac{945\ torr}{1\ torr} \times \frac{1\ mm\ Hg}{} = 945\ mm\ Hg$

3. Using your knowledge of gas laws complete the following table:

P1	V1	P2	V2
755 mm Hg	2.85L	885 mm Hg	243L
9.35atm	1.33 L	4.32 atm	2.88 L
192 mm Hg	325 mL	129.96mmHg	482 mL
2.11 atm	172.63ml	2.35 atm	155 mL
3.21 atm	3.25 mL	1.12atm	9.32 mL
6.52 atm	4.68 ml	3.56 atm	8.57 mL

Boyle's Law

$P_1V_1 = P_2V_2$

$PV = nRT$

Ideal gas law

$R = 0.0821$

P	V	n	T
1.02 atm	1.15 L	0.112 mol	127.57K
154 ~~torr~~ atm	0.039L	0.241 mol	305K
344.79 atm	25.9 Ml	0.365 mol	25 C
0.365 atm	0.256 L	0.0043 mol	265 K

4. A balloon with an initial temperature of 345 K has a volume of 3.25 L. If the balloon is cooled to 299 K, what will the final volume be?

$V_1 T_2 = V_2 T_1$

$(3.25)(299K) = (x)(345K)$

$V_1 = 3.25L$

$T_2 = 299K$

$V_2 = X$

$T_1 = 345K$

2.82 L

Combined gas law

5. A gas sample with an initial volume of 35.2 L at a pressure of 55 atm and a temperature of 296K is compressed to a volume of 22.5 L and warmed to a temperature of 300K. What is the final pressure of the gas?

$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$ $\frac{(55)(35.2)}{296} = \frac{(x)(22.5)}{300}$

87.2atm

6. A gas mixture contains 88% Nitrogen and 12% oxygen. If the total pressure is 1.24 atm, what are the partial pressures of each element?

mm Hg

88% N

+ 12% O

100%

.88 N

.12 O

$.88 \times 1.24 =$ 1.09 atm

$.12 \times 1.24 =$ 0.15 atm

1.24 atm