Name _____   **AP Chem**   ___/___/___

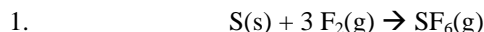## Chapter 5 Homework #2

Circle and write the letter of the correct answer on the line for each of the following.

1._____ $S(s) + 3 F_2(g) \rightarrow SF_6(g)$
For the reaction above at standard temperature and pressure, the volume of F_2 required to produce 0.500 mole of SF_6 is:
(A) 67.2 liters   (B) 33.6 liters   (C) 22.4 liters   (D) 11.2 liters   (E) 1.5 liters

2._____   A sample of 1.00 mole of hydrogen gas is mixed with 5.00 mole of helium gas. If the total pressure of the system is 3.00 atmospheres, the partial pressure of the helium gas is:
(A) 0.500 atm   (B) 1.00 atm   (C) 1.50 atm   (D) 2.00 atm   (E) 2.50 atm

3._____   The density of a certain gas was measured to be 2.68 grams per liter at 3.00 atm. and 27°C. What is the molecular mass of the gas?
(A) 16.0   (B) 20.0   (C) 22.0   (D) 60.0   (E) 132

4._____   At the same temperature, the RMS speed of O_2 gas is how many times that of SO_2 gas ?
(A) 1.4   (B) 2   (C) 4   (D) .5   (E) .25

5._____   The density of oxygen gas at 25°C and 4.0 atmospheres pressure is approximately
(A) 1.3 gram/liter   (B) 2.6 gram/liter   (C) 3.2 gram/liter   (D) 5.2 gram/liter   (E) 7.3 gram/liter

6._____   A hydrocarbon with an empirical formula CH2 is found to have a mass of 5.01 grams at a pressure of 1.00 atm, a temperature of 0°C., and a volume of 2.00 liters. A possible formula   for this hydrocarbon is:
(A) CH_2 (B) C_2H_4 (C) C_3H_6 (D) C_4H_8 (E) C_5H_{10}

7._____   A sample of an ideal gas is cooled from 50.0° C to 25.0°C in a sealed container of constant volume. Which of the following values for the gas will decrease?
   I. The density of the gas.   II. The average distance between the molecules   III. The average speed of the molecules.

(A) I only   (B) II only   (C) III only   (D) I and III   (E) II and III

8._____   Collisions between gas particles and container walls result in a measurable pressure. Pressure varies:
      I. Directly with Kelvin temperature   II. Inversely with the volume of the container
                  III. Directly with the concentration of gas particles.

(A) I only   (B) II only   (C) I and II only   (D) I, II, and III   (E) I and III only

9._____   A 66.0g sample of solid CO_2 vaporizes completely to fill an empty plastic bag to a final volume of 22.4 L at 0° C. What is the final pressure in the sealed bag?
(A) 380 mm Hg   (B) 507 mm Hg   (C) 760 mm Hg   (D) 1140 mm Hg   (E) 1520 mm Hg

10._____   A mixture of nitrogen and helium gases containing 4.00 grams of helium, exerts a total pressure of 800. mm Hg. If the partial pressure of the nitrogen gas is 480 mm of Hg, what is the mass of the nitrogen gas in the mixture?
(A) 21.0 g   (B) 42.0 g   (C) 56.0 g   (D) 28.0 g   (E) 6.00 g

11._____   The density of an unknown gas is 4.20 grams per liter at 3.00 atmospheres pressure and 127 °C. What is the molecular weight of this gas?
(A) 14.6   (B) 46.0   (C) 88.0   (D) 94.1   (E) 138

12._____ A 2.00-liter sample of nitrogen gas at 27 °C and 600. millimeters of mercury is heated until it occupies a volume of 5.00 liters. If the pressure remains unchanged, the final temperature of the gas is
(A) 68 °C   (B) 120 °C   (C) 477 °C   (D) 677 °C   (E) 950. °C

13._____ A hydrocarbon gas with an empirical formula CH_2 has a density of 1.88 grams per liter at 0 °C and 1.00 atmospheres. A possible formula for the hydrocarbon is
(A) CH_2 (B) C_2H_4 (C) C_3H_6 (D) C_4H_8 (E) C_5H_{10}

14._____ A compound is heated to produce a gas whose molecular weight is to be determined. The gas is collected by displacing water in a water-filled flask inverted in a trough of water. Which of the following is necessary to calculate the molecular weight of the gas, but does NOT need to be measured during the experiment?
(A) Mass of the compound used in the experiment   (B) Temperature of the water in the trough   (C) Vapor pressure of the water
            (D) Barometric pressure   (E) Volume of water displaced from the flask

15._____ Hydrogen gas is collected over water at 24°C. The total pressure of the sample is 755 millimeters of mercury. At 24°C, the vapor pressure of water is 22 millimeters of mercury. What is the partial pressure of the hydrogen gas?
(A) 22 mm Hg   (B) 733 mm Hg   (C) 755 mm Hg   (D) 760 mm Hg   (E) 777 mm Hg

16._____ Which of the following is true at the triple point of a pure substance?
(A) The vapor pressure of the solid phase always equals the vapor pressure of the liquid phase.
(B) The temperature is always 0.01 K lower that the normal melting point.
(C) The liquid and gas phases of the substance always have the same density and are therefore indistinguishable.
(D) The solid phase always melts if the pressure increases at constant temperature.
(E) The liquid phase always vaporizes if the pressure increases at constant temperature.

17._____ A hot-air balloon rises. Which of the following is the best explanation for this observation?
(A) The pressure on the walls of the balloon increases with increasing temperature.
(B) The difference in temperature between the air inside and outside the balloon produces convection currents.
(C) The cooler air outside the balloon pushes in on the walls of the balloon.
(D) The rate of diffusion of cooler air is less than that of warmer air.
(E) The air density inside the balloon is less than that of the surrounding air.

18._____ Which of the following gases deviates most from ideal behavior?
(A) SO_2 (B) Ne   (C) CH_4 (D) N_2 (E) H_2

19._____ $NH_4NO_3(s) \rightarrow N_2O(g) + 2 H_2O(g)$
A 0.03 mol sample of $NH_4NO_3(s)$ is placed in a 1 L evacuated flask, which is then sealed and heated. NH_4NO_3 decomposes completely according to the balanced equation above. The total pressure in the flask measured at 400 K is closest to which of the following?
(A) 3 atm   (B) 1 atm   (C) 0.5 atm   (D) 0.1 atm   (E) 0.03 atm

20._____ Equal masses of He and Ne are placed in a sealed container. What is the partial pressure of He if the total pressure in the container is 6 atm?
(A) 1 atm   (B) 2 atm   (C) 3 atm   (D) 4 atm   (E) 5 atm

21._____At standard temperature and pressure, a 0.50 mol sample of H_2 gas and a separate 1.0 mol sample of O2 gas have the same:
(A) average molecular kinetic energy   (B) average molecular speed   (C) volume
                        (D) effusion rate   (E) density

Gas	Amount
Ar	0.35 mol
CH_4	0.90 mol
N_2	0.25 mol

22._____ Three gases in the amounts shown in the table to the right are added to a previously evacuated rigid tank. If the total pressure in the tank is 3.0 atm at 25°C, the partial pressure of $N_2(g)$ in the tank is closest to
(A) 0.75 atm   (B) 0.50 atm   (C) 0.33 atm   (D) 0.25 atm   (E) 0.17 atm

23._____ At 25°C, C_2H_6 effuses at a rate of 0.55 mol/minute. Which gas would have a rate of effusion approximately one-fast as fast?
(A) He   (B) CH_4 (C) NO   (D) N_2O_3 (E) Cl_2O_3

24._____ An ideal gas in a rigid sealed container is heated from 330 K to 430 K. Which of the following DO NOT change?
I. The density of the gas   II. The average distance between molecules   III. The average speed of the molecules

(A) I only   (B) III only   (C) I & II only   (D) I & III only   (E) I, II, & III

25._____ What is the total pressure after 2.00 moles of $H_2(g)$, 1.00 mole of $O_2(g)$, 2.00 moles of $N_2(g)$ and 1.00 mole $CO_2(g)$ are injected into a rigid 22.4 L container 273 K?
(A) 760 mmHg   (B) 2280 mmHg   (C) 4560 mmHg   (D) 9120 mmHg   (E) 63,500 mmHg