**(Brown et al.)**

**Chapter 10 Gases**

10.1 Multiple Choice Questions

1) Which of the following statements about gases is false?

A) Gases are highly compressible.

B) Distances between molecules of gas are very large compared to bond distances within molecules.

C) Non-reacting gas mixtures are homogeneous.

D) Gases expand spontaneously to fill the container they are placed in.

E) All gases are colorless and odorless at room temperature.

2) One significant difference between gases and liquids is that \_\_\_\_\_\_\_\_\_\_.

A) a gas is made up of molecules

B) a gas assumes the volume of its container

C) a gas may consist of both elements and compounds

D) gases are always mixtures

E) All of the above answers are correct.

3) Which statement about atmospheric pressure is false?

A) As air becomes thinner, its density decreases.

B) Air actually has weight.

C) With an increase in altitude, atmospheric pressure increases as well.

D) The warmer the air, the lower the atmospheric pressure.

E) Atmospheric pressure prevents water in lakes, rivers, and oceans from boiling away.

4) Of the following, \_\_\_\_\_\_\_\_\_\_ is a correct statement of Boyle's law.

A) *PV* = constant

B)  = constant

C)  = constant

D)  = constant

E)  = constant

5) Of the following, only \_\_\_\_\_\_\_\_\_\_ is impossible for an ideal gas.

A) 

B) V1T1 = V2T2

C) 

D) 

E) 

6) The molar volume of a gas at STP is \_\_\_\_\_\_\_\_\_\_ L.

A) 0.08206 B) 62.36 C) 1.00 D) 22.4 E) 14.7

7) How many moles of gas are there in a 45.0 L container at 25.0°C and 500.0 mm Hg?

A) 0.630 B) 6.11 C) 18.4 D) 1.21 E) 207

8) Standard temperature and pressure (STP), in the context of gases, refers to \_\_\_\_\_\_\_\_\_\_.

A) 298.15 K and 1 atm

B) 273.15 K and 1 atm

C) 298.15 K and 1 torr

D) 273.15 K and 1 pascal

E) 273.15 K and 1 torr

9) The volume of 1.20 mol of gas at 61.3 kPa and 25.0°C is \_\_\_\_\_\_\_\_\_\_ L.

A) 135 B) 48.5 C) 52.4 D) 108 E) 55.7

10) Sodium bicarbonate is reacted with concentrated hydrochloric acid at 37.0°C and 1.00 atm. The reaction of 6.00 kg of bicarbonate with excess hydrochloric acid under these conditions will produce \_\_\_\_\_\_\_\_\_\_ L of CO2.

A) 1.09 × 102 B) 2.85 × 104 C) 1.82 × 104 D) 8.70 × 102 E) 1.82 × 103

Answer: E

Diff: 5 (I would probably give you the balanced equation if I asked this one. Diff:5 means that the authors consider it very difficult)

11) The volume of a sample of gas (2.49 g) was 752 mL at 1.98 atm and 62°C. The gas is \_\_\_\_\_\_\_\_\_\_.

A) SO2 B) SO3 C) NH3 D) NO2 E) Ne

12) The density of \_\_\_\_\_\_\_\_\_\_ is 0.900 g/L at STP.

A) CH4 B) Ne C) CO D) N2 E) NO

13) A 255 mL round-bottom flask is weighed and found to have a mass of 114.85 g. A few milliliters of an easily vaporized liquid are added to the flask and the flask is immersed in a boiling water bath. All of the liquid vaporizes at the boiling temperature of water, filling the flask with vapor. When all of the liquid has vaporized, the flask is removed from the bath, cooled, dried, and reweighed. The new mass of the flask and the condensed vapor is 115.23 g. Which of the following compounds could the liquid be? (Assume the ambient pressure is 1 atm.)

A) C4H10 B) C3H7OH C) C2H6 D) C2H5OH E) C4H9OH

Answer: D

Diff: 5

14) 10.0 grams of argon and 20.0 grams of neon are placed in a 1200.0 ml container at 25.0°C. The partial pressure of neon is \_\_\_\_\_\_\_\_\_\_ atm.

A) 20.4 B) 8.70 C) 0.700 D) 3.40 E) 5.60

15) A mixture of Xe, Kr, and Ar has a total pressure of 6.70 atm. What is the mole fraction of Kr if the partial pressures of Xe and Ar are 1.60 atm and 2.80 atm, respectively.

A) 0.174 B) 0.256 C) 0.343 D) 0.481 E) 0.570

16) The average kinetic energy of the particles of a gas is directly proportional to \_\_\_\_\_\_\_\_\_\_.

A) the rms speed B) the square of the rms speed C) the square root of the rms speed

D) the square of the particle mass E) the particle mass

17) According to kinetic-molecular theory, in which of the following gases will the root-mean-square speed of the molecules be the highest at 200°C?

A) HCl B) Cl2 C) H2O D) SF6

E) None. The molecules of all gases have the same root-mean-square speed at any given temperature.

18) According to kinetic-molecular theory, if the temperature of a gas is raised from 100°C to 200°C, the average kinetic energy of the gas will \_\_\_\_\_\_\_\_\_\_.

A) double B) increase by a factor of 1.27 C) increase by a factor of 100

D) decrease by half E) decrease by a factor of 100

19) A tank containing both HF and HBr gases developed a leak. The ratio of the rate of effusion of HF to the rate of effusion of HBr is \_\_\_\_\_\_\_\_\_\_.

A) 4.04 B) 0.247 C) 2.01 D) 0.497 E) 16.3

20) A sample of oxygen gas (O2) was found to effuse at a rate equal to three times that of an unknown gas. The molecular weight of the unknown gas is \_\_\_\_\_\_\_\_\_\_ g/mol.

A) 288 B) 96 C) 55 D) 4 E) 10.7

21) An ideal gas differs from a real gas in that the molecules of an ideal gas \_\_\_\_\_\_\_\_\_\_.

A) have no attraction for one another

B) have appreciable molecular volumes

C) have a molecular weight of zero

D) have no kinetic energy

E) have an average molecular mass

22) A real gas will behave most like an ideal gas under conditions of \_\_\_\_\_\_\_\_\_\_.

A) high temperature and high pressure

B) high temperature and low pressure

C) low temperature and high pressure

D) low temperature and low pressure

E) STP

23) A sample of a gas (5.0 mol) at 1.0 atm is expanded at constant temperature from 10 L to 15 L. The final pressure is \_\_\_\_\_\_\_\_\_\_ atm.

A) 1.5 B) 7.5 C) 0.67 D) 3.3 E) 15

24) A sample of a gas (1.50 mol) is contained in a 15.0 L cylinder. The temperature is increased from 100°C to 150°C. The ratio of final pressure to initial pressure  is \_\_\_\_\_\_\_\_\_\_.

A) 1.50 B) 0.667 C) 0.882 D) 1.13 E) 1.00

25) A sample of a gas originally at 25°C and 1.00 atm pressure in a 2.5 L container is subject to a pressure of 0.85 atm and a temperature of 15°C. The final volume of the gas is \_\_\_\_\_\_\_\_\_\_ L.

A) 3.0 B) 2.8 C) 2.6 D) 2.1 E) 0.38

26) The reaction of 50 mL of N2 gas with 150 mL of H2 gas to form ammonia via the equation:

 N2 (g) + 3H2 (g) → 2NH3 (g)

will produce \_\_\_\_\_\_\_\_\_\_ mL of ammonia if pressure and temperature are kept constant.

A) 250 B) 50 C) 200 D) 150 E) 100

27) The molecular weight of a gas is \_\_\_\_\_\_\_\_\_\_ g/mol if 6.7 g of the gas occupies 6.3 L at STP.

A) 24

B) 3.6 × 103

C) 27

D) 3.0 × 102

E) 1.8 × 10-2

28) The volume of hydrogen gas at 45.0°C and 699 torr that can be produced by the reaction of 5.66 g of zinc with excess sulfuric acid is \_\_\_\_\_\_\_\_\_\_ L.

A) 2.84 B) 2.71 × 10-4 C) 3.69 × 104 D) 2.45 E) 0.592

29) Automobile air bags use the decomposition of sodium azide as their source of gas for rapid inflation:

 2NaN3 (s) → 2Na (s) + 3N2 (g).

What mass (g) of NaN3 is required to provide 40.0 L of N2 at 25.0°C and 763 torr?

A) 1.64 B) 1.09 C) 160 D) 71.1 E) 107

EBCABDDBBE

DBDACBCBCA

ABCDBEADD