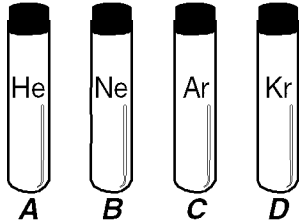


Name: _____

___ 1) The stoppered tubes below, labeled A through D, each contain a different gas.



When the tubes are unstoppered at the same time and are under the same conditions of temperature and pressure, from which tube will gas diffuse at the fastest rate?

- 1) A
- 2) B
- 3) C
- 4) D

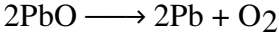
___ 2) As the atmospheric pressure increases, the temperature at which water in an open container will boil

- 1) decreases
- 2) increases
- 3) remains the same

___ 3) A 100. milliliter sample of a gas at a pressure of 50.65 kPa is reduced to 25.33 kPa at constant temperature. What is the new volume of the gas?

- 1) 290. mL
- 2) 90.0 mL
- 3) 50.0 mL
- 4) 200. mL

___ 4) Given the reaction:



What is the total volume of O₂ measured at STP, produced when 1.00 mole of PbO decomposes?

- 1) 5.60 L
- 2) 11.2 L
- 3) 22.4 L
- 4) 44.8 L

___ 5) According to the Vapor Pressure of Four Liquids chemistry reference table, which substance is most volatile?

- 1) propanone
- 2) ethanoic acid
- 3) ethanol
- 4) water

___ 6) A 15-gram sample of a gas has a volume of 30. liters at STP. What is the density of the gas?

- 1) 0.50 g/L
- 2) 15. g/L
- 3) 30. g/L
- 4) 2.0 g/L

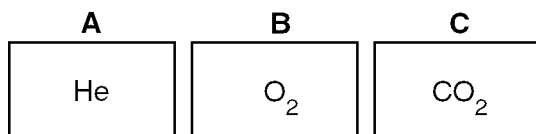
___ 7) Samples of SO₂(g) and N₂(g) contain equal numbers of molecules. If the gases are at STP, the samples have

- 1) the same density
- 2) equal volumes
- 3) equal numbers of atoms
- 4) the same molecular mass

___ 8) Which gas will diffuse at the fastest rate under the same conditions of temperature and pressure?

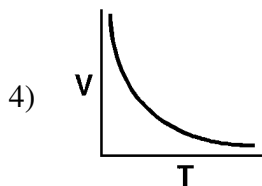
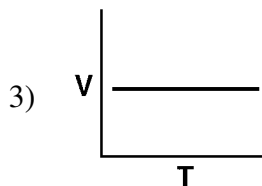
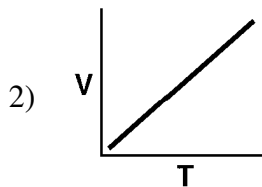
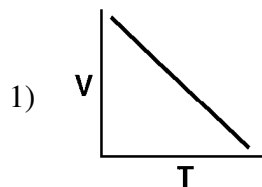
- 1) N₂
- 2) F₂
- 3) H₂
- 4) O₂

- ___ 9) The diagrams below represent three 1-liter containers of gas, A, B, and C. Each container is at STP.



Which of the following statements correctly compares the number of molecules in the containers?

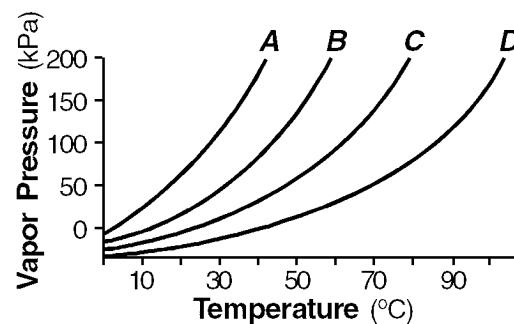
- ___ 10) What is the boiling point of propanone at standard atmospheric pressure?
- ___ 11) At constant pressure, which graph shows the correct relationship between the volume of a gas (V) and its absolute temperature (T)?



- ___ 12) According to the *Vapor Pressure of Four Liquids* chemistry reference table, if the pressure on the surface of water in the liquid state is 47.0 kPa, the water will boil at

- ___ 13) What is the vapor pressure of a liquid at its normal boiling temperature?

- ___ 14) The chart below shows the change in vapor pressure of four liquids with increasing temperature.



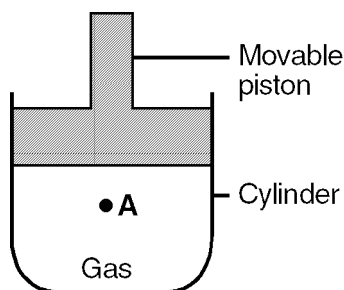
- What liquid has the *lowest* normal boiling point?
- ___ 15) How many moles are in 5.6 liters of a gas at STP?
- ___ 16) At a temperature of 273 K, a 400-milliliter gas sample has a pressure of 101.3 kPa. If the pressure is changed to 50.65 kPa, at what temperature will this gas sample have a volume of 600 milliliters?

- ___ 17) Which sample of water has the *greatest* vapor pressure?
- 1) 200 mL at 25 °C
 - 2) 20 mL at 30 °C
 - 3) 100 mL at 20 °C
 - 4) 40 mL at 35 °C
- ___ 18) A 2.5-liter sample of gas is at STP. When the temperature is raised to 273 °C and the pressure remains constant, the new volume of the gas will be
- 1) 5.0 L
 - 2) 10. L
 - 3) 1.25 L
 - 4) 2.5 L
- ___ 19) As the space between molecules in a gas sample decreases, the tendency for the behavior of this gas to deviate from the ideal gas laws
- 1) decreases
 - 2) remains the same
 - 3) increases
- ___ 20) A gas has a pressure of 40.0 kPa, a temperature of 400. K, and a volume of 50.0 milliliters. What volume will the gas have at a pressure of 20.0 kPa and a temperature of 200. K?
- 1) 50.0 mL
 - 2) 200. mL
 - 3) 12.5 mL
 - 4) 100. mL
- ___ 21) An ideal gas is made up of gas particles that
- 1) can be liquefied
 - 2) attract each other
 - 3) are in random motion
 - 4) have volume
- ___ 22) A 1-liter flask contains two gases at a total pressure of 3.0 atmospheres. If the partial pressure of one of the gases is 0.5 atmosphere, then the partial pressure of the other gas must be
- 1) 0.50 atm
 - 2) 1.5 atm
 - 3) 2.5 atm
 - 4) 1.0 atm
- ___ 23) A 2.00-gram sample of helium gas at STP will occupy a volume of
- 1) 33.6 L
 - 2) 44.8 L
 - 3) 11.2 L
 - 4) 22.4 L
- ___ 24) One reason that a real gas deviates from an ideal gas is that the molecules of the real gas have
- 1) forces of attraction for each other
 - 2) no net loss of energy on collision
 - 3) a straight-line motion
 - 4) a negligible volume
- ___ 25) Given the reaction:
- $$2\text{CH}_3\text{OH}(\ell) + 3\text{O}_2(\text{g}) \longrightarrow 2\text{CO}_2(\text{g}) + 4\text{H}_2\text{O}(\text{g})$$
- How many liters of O₂(g) are needed to produce exactly 200 liters of CO₂(g)?
- 1) 200 L
 - 2) 400 L
 - 3) 300 L
 - 4) 100 L
- ___ 26) Which change must result in an increase in the average kinetic energy of the molecules of a sample of N₂(g)?
- 1) The pressure changes from 0.5 atmosphere to 1 atmosphere.
 - 2) The temperature changes from 20 °C to 30 °C.
 - 3) The density changes from 2.0 g/l to 2.5 g/l.
 - 4) The volume changes from 1 liter to 2 liters.
- ___ 27) What Kelvin temperature is the same as -13 ° Celsius?
- 1) 747 K
 - 2) 286 K
 - 3) 773 K
 - 4) 260 K
- ___ 28) As the temperature of a sample of a gas increases at constant pressure, the volume of the gas sample
- 1) decreases
 - 2) increases
 - 3) remains the same

___ 29) A sample of oxygen gas in a closed system has a volume of 200 milliliters at 600 K. If the pressure is held constant and the temperature is lowered to 300 K, the new volume of the gas will be

- 1) 300 mL
- 2) 100 mL
- 3) 400 mL
- 4) 200 mL

___ 30) The diagram represents a gas confined in a cylinder fitted with a movable piston.



As the piston moves toward point A at constant temperature, which relationship involving pressure (P) and volume (V) is correct?

- 1) $P - V = k$
- 2) $P \times V = k$
- 3) $P + V = k$
- 4) $\frac{P}{V} = k$

___ 35) In a laboratory experiment, students measured the vapor pressure of two unknown liquids. Their data is recorded in the table below.

Substance	Vapor Pressure (kPa)	Temperature ($^{\circ}\text{C}$)
X	115	60
Y	145	110

Based on the data shown, substance X could be

- 1) propanone
- 2) ethanol
- 3) water
- 4) ethanoic acid

___ 31) When 7.00 moles of gas A and 3.00 moles of gas B are combined, the total pressure exerted by the gas mixture is 1.0 atm. What is the partial pressure exerted by gas A in this mixture?

- 1) 0.70 atm
- 2) 1.0 atm
- 3) 0.10 atm
- 4) 0.30 atm

___ 32) The temperature 30. K expressed in degrees Celsius is

- 1) 243°C
- 2) -303°C
- 3) -243°C
- 4) 303°C

___ 33) Which gas under high pressure and low temperature has a behavior *closest* to that of an ideal gas?

- 1) $\text{O}_2(\text{g})$
- 2) $\text{NH}_3(\text{g})$
- 3) $\text{CO}_2(\text{g})$
- 4) $\text{H}_2(\text{g})$

___ 34) Which gas has approximately the same density as C_2H_6 at STP?

- 1) NH_3
- 2) H_2S
- 3) NO
- 4) SO_2