

Under Pressure WS

Name: KEY

1) Convert:

a) $0.200 \text{ atm} \left(\frac{760. \text{ mmHg}}{1 \text{ atm}} \right) = \underline{152} \text{ mm Hg}$ | b) $78.0 \text{ kPa} \left(\frac{1 \text{ atm}}{101.325 \text{ kPa}} \right) = \underline{0.770} \text{ atm}$

c) $780. \text{ torr} \left(\frac{1 \text{ atm}}{760. \text{ torr}} \right) = \underline{1.03} \text{ atm}$ | d) $153,000 \text{ Pa} \left(\frac{1 \text{ atm}}{101,325 \text{ Pa}} \right) = \underline{1.51} \text{ atm}$

2) Make the following temperature conversions:

a) $273 \text{ K} = \underline{0} \text{ }^\circ\text{C}$ b) $100 \text{ }^\circ\text{C} = \underline{373} \text{ K}$ c) $25 \text{ }^\circ\text{C} = \underline{298} \text{ K}$

d) $0 \text{ K} = \underline{-273} \text{ }^\circ\text{C}$ e) $0 \text{ }^\circ\text{C} = \underline{273} \text{ K}$ f) $300. \text{ K} = \underline{27} \text{ }^\circ\text{C}$

3) Absolute zero is the coldest possible temperature.

a) What is occurring to the molecular or atomic motion at absolute zero?

no molecular motion at all

b) What is the value of absolute zero in Kelvin and Celsius? 0 K or -273.15 °C

4) Standard Temperature and Pressure (STP) is used by chemists to standardize the study of gases.

Give the values for STP in the following units:

0 °C 1 atm
273 K 760 mm Hg

5) At STP, oxygen gas has a density of 1.43 g/L. How many moles of oxygen are in a liter at STP?

$$\frac{1.43 \text{ g}}{1 \text{ L}} \left(\frac{1 \text{ mol O}_2}{32.00 \text{ g}} \right) = \underline{0.0447 \text{ mol O}_2}$$

6) At STP, nitrogen gas has a density of 1.25 g/L. How many moles of nitrogen are in a liter at STP?

$$\frac{1.25 \text{ g N}_2}{1 \text{ L}} \left(\frac{1 \text{ mol N}_2}{28.02 \text{ g}} \right) = \underline{0.0446 \text{ mol N}_2}$$

7) What do you notice about your answers for #5 and #6? Explain what this means in terms of moles of a gas in a liter at a given temperature and pressure.

At same temp / pressure / volume there should be almost equal moles of any gas

8) Where is atmospheric pressure the greatest? Why?

↳ lower towards the earth because the air molecules are pulled down by gravity