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# AP Chemistry – Gas Characteristics – 21

Name _____Per ___

1. Perform the following conversions:

(a) 2.44 atm to torr

(b) 682 torr to kilopascals

(c) 776 mm Hg to atmospheres

(d) 1.456 x $10^5$ Pa to atmospheres

2. (a) On Titan, the largest moon of Saturn, the atmospheric pressure is 1.63105 Pa. What is the atmospheric pressure on Titan in atmospheres? (b) On Venus the surface atmospheric pressure is about 90.0 Earth atmospheres. What is the Venusian atmospheric pressure in kilopascals?

3. A set of bookshelves, on Earth, rests on a hard floor surface. The edges of the two vertical sides of the shelves, each of which has a cross-sectional dimension of 2.2 x 30. cm, are the only part of the bookshelf in contact with the floor. The total mass of the shelves plus the books stacked on them is 262 kg. Calculate the pressure in pascals, exerted by the shelf footings on the surface.

4. What would happen to the gas pressure inside a cylinder, with a movable piston, if you do the following?

(a) Decrease the volume to one-third the original volume while holding the temperature constant.

(b) Reduce the Kelvin temperature to half its original value while holding the volume constant.

(c) Reduce the amount of gas to half while keeping the volume and temperature constant.

5. Nitrogen and hydrogen gases react to form ammonia gas.

(a) Write a balanced chemical equation for the process.

(b) At a certain temperature and pressure, 1.2 L of $N_2$ reacts with 3.6 L of $H_2$. If all the $N_2$ and $H_2$ are changed to ammonia, what volume of ammonia, at the same initial temperature and pressure, will be produced?

6. What conditions are represented by the abbreviation STP?

7. Calculate the molar volume of an ideal gas at STP. (Show your work.)

8. Room temperature is often around $25^{\circ C}$. Calculate the molar volume of an ideal gas at room temperature.