a. What does Boyle' law state?

For a fixed mass of an ideal gas kept at a fixed temperature, pressure and volume are inversely proportional. Or Boyle's law is a gas law, stating that the pressure and volume of a gas have an inverse relationship.

b.What is Charles's and Boyle' law?

Boyle showed that the volume of a sample of a gas is inversely proportional to its pressure (Boyle's law), Charles and Gay-Lussac demonstrated that the volume of a gas is directly proportional to its temperature (in kelvins) at constant pressure (Charles's law), and Avogadro postulated that the volume of a gas is .

c.Gas laws

The Ideal Gas Law:

A combination of the laws presented above generates the Ideal Gas Law:

- Boyle's law $V \propto 1/P$
- Charles's law $V \propto T$
- Avogadro's law $V \propto n$

$$V \propto \frac{nT}{P}$$

$$V = R\,\frac{nT}{P}$$

$$PV = nRT$$

d.Combined Gas law

The Combined Gas Law

I said above that memorizing all of the equations for each of the individual gas laws would become irrelevant after the introduction of the laws that followed. The law I was referring to is the Combined Gas Law:

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

The combined gas law allows you to derive any of the relationships needed by combining all of the changeable peices in the ideal gas law: namely pressure, temperature and volume. R and the number of moles do not appear in the equation as they are generally constant and therefore cancel since they appear in equal amounts on both sides of the equation.

e. What is real gas equation?

Originally, the ideal gas law looks like this: PV = nRT. P is the pressure in atmospheres, V is the volume of the container in liters, n is the number of moles of gas, R is the ideal gas constant (0.0821 L-atm/mol-K), and T is the temperature in Kelvin.

f.How do derive a real gas equation?

According to ideal gas law, PV = nRT where P is the pressure, V is the volume, n is the number of moles, T is the temperature and R is the universal gas constant.

g.What is a and b in Vander Waal equation?

The constants a and b are called van der Waals constants. ... If a gas behaves ideally, both a and b are zero, and van der Waals equations approaches the ideal gas law PV=nRT. The constant a provides a correction for the intermolecular forces. Constant b adjusts for the volume occupied by the gas particles.

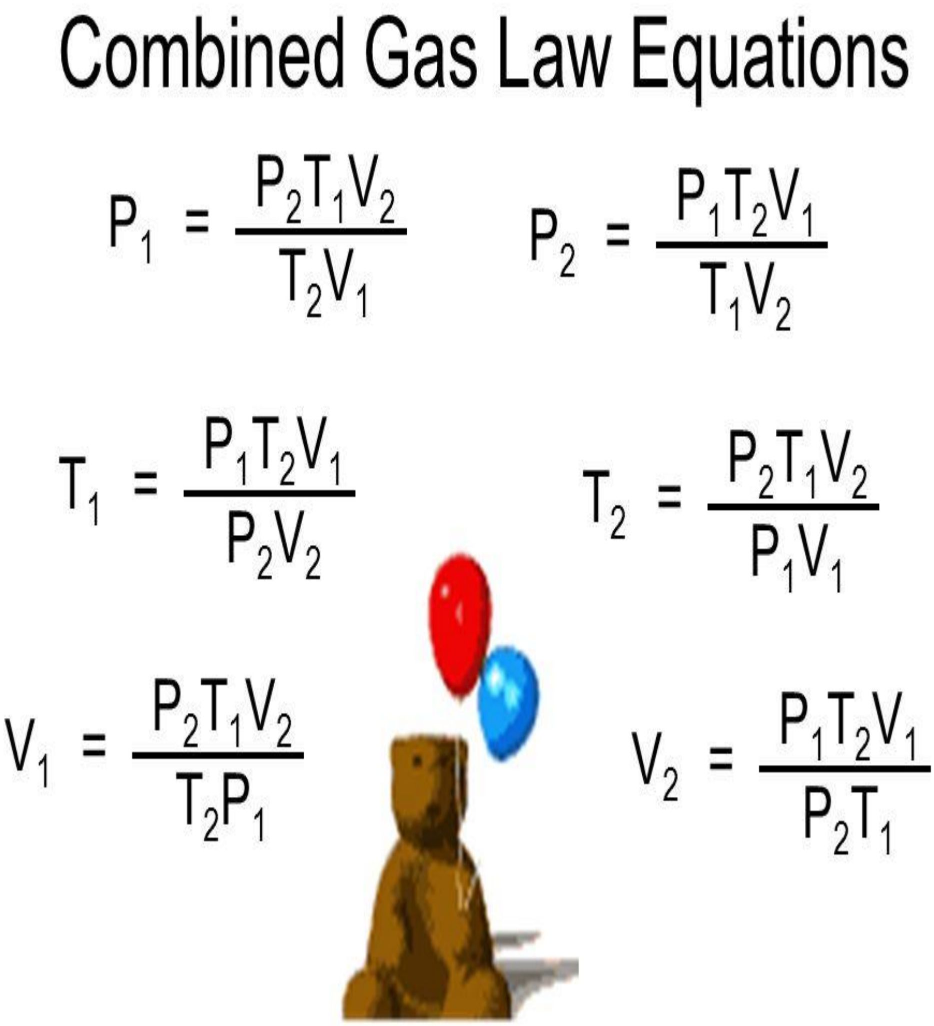
h.What are the units of Vander Waal constant?

The van der Waal's equation of state for a real gas is: $(P + n^2a / V^2)(V- nb) = nRT$ To convert 'a' into atm L^2/mol^2 multiply by 0.986 atm/bar To convert 'a' into kPa L^2/mol^2 multiply by 100.0 kPa/bar

Molecular Formula	Name	b L/mol

BCl_3	Boron trichloride	0.1222
BF_3	Boron trifluoride	0.05443
B_2H_6	Diborane	0.07437

i.



As you can see above, the equation can be solved for any of the parameters in it. But more importantly, you can eliminate from the equation anything that will remain constant.

For Example, If a question said that a system at 1atm and a volume of 2 liters, underwent a change to 3.5 liters, calculate the new pressure, you could simply eliminate temperature from the equation and yield:

$$P_1V_1 = P_2V_2$$

$$P_2 = P_1V_1/V_2 = (1atm)(2L)/3.5L) = 0.6\ atm$$

g.What does Dalton’s laws of partial pressure says?

Dalton's Law, or the Law of Partial Pressures, states that the total pressure exerted by a mixture of gases is equal to the sum of the partial pressures of the gases in the mixture.

k. What is Dalton’s law formula?

Dalton's law Formula. Definition: The Dalton's law is also a law for explaining the behavior of gases and more specifically, for mixture of gases. ... So, the number of the moles in a mixture of gases is equal to the sum of the moles of each gas.

l.What is Z in thermodynamics?

The compressibility factor (Z), also known as the compression factor or the gas deviation factor, is a correction factor which describes the deviation of a real gas from ideal gas behaviour. ... It is a useful thermodynamic property for modifying the ideal gas law to account for the real gas behaviour.

m.Vander Waal equation?

The van der Waals equation (or van der Waals equation of state; named after Johannes Diderik van der Waals) is an equation of state that generalizes the ideal gas law based on plausible reasons that real gases do not act ideally. The ideal gas law treats gas molecules as point particles that interact with their containers but not each other, meaning they neither take up space nor change kinetic energy during collisions.[1] The ideal gas law states that volume (*V*) occupied by n moles of any gas has a pressure (*P*) at temperature (*T*) in kelvins given by

the following relationship, where R is the gas constant:

$PV = nRT$,

To account for the volume that a real gas molecule takes up, the van der Waals equation replaces V in the ideal gas law with , where V_m is the molar volume of the gas and b is the volume that is occupied by one mole of the molecules. This leads to

The second modification made to the ideal gas law accounts for the fact that gas molecules do in fact attract each other and that real gases are therefore more compressible than ideal gases. Van der Waals provided for intermolecular attraction by adding to the observed pressure P in the equation of state a term , where a is a constant whose value depends on the gas. The van der Waals equation is therefore written as:

and can also be written as the equation below

where V_m is the molar volume of the gas, R is the universal gas constant, T is temperature, P is pressure, and V is volume. When the molar volume V_m is large, b becomes negligible in comparison with V_m, a/V_m^2 becomes negligible with

respect to *P*, and the van der Waals equation reduces to the ideal gas law, $PV_m=RT$. It is available via its traditional derivation (a mechanical equation of state), or via a derivation based in statistical thermodynamics, the latter of which provides the partition function of the system and allows thermodynamic functions to be specified. It successfully approximates the behavior of real fluids above their critical temperatures and is qualitatively reasonable for their liquid and low-pressure gaseous states at low temperatures. However, near the transitions between gas and liquid, in the range of *p*, *V*, and *T* where the liquid phase and the gas phase are in equilibrium, the *van der Waals equation* fails to accurately model observed experimental behaviour, in particular that *p* is a constant function of *V* at given temperatures. As such, the van der Waals model is not useful only for calculations intended to predict real behavior in regions near the critical point. Corrections to address these predictive deficiencies have since been made e.g., equal area rule, principle of corresponding states.

n. What is facilitated diffusion?

Facilitated diffusion (also known as facilitated transport or passive-mediated transport) is the process of spontaneous passive transport (as opposed to active transport) of molecules or ions across a biological membrane via specific transmembrane integral proteins.

o.What is the difference between diffusion and facilitated diffusion?

In facilitated diffusion, molecules only move with the aid of a protein in the membrane. ... Simple diffusion is passive but facilitated diffusion is an active process that uses energy. Simple diffusion requires molecules to move through special doorways in the cell membrane.

p.What is an example of facilitated diffusion?

In the cell, examples of molecules that must use facilitated diffusion to move in and out of the cell membrane are glucose, sodium ions, and potassium ions. They pass using carrier proteins through the cell membrane without energy along the concentration gradient.

q.What is facilitated diffusion diffusion is it active or passive?

Comparing Facilitated Diffusion and Active Transport. ... This process is called passive transport or facilitated diffusion, and does not require energy. The solute can move "uphill," from regions of lower to higher concentration. This process is called active transport, and requires some form of chemical energy.

r.What are two types of facilitated diffusion?

While there are hundreds of different proteins throughout the cell, only two types are found associated with facilitated diffusion: channel proteins and carrier proteins. Channel proteins typically are used to transport ions in and out of the cell. Channel proteins come in two forms, open channels and gated channels.

s.Does facilitated diffusion require ATP?

Explanation: Facilitated diffusion doesn't require ATP because it is the passive movement of molecules such as glucose and amino acid across the cell membrane. It does so with the aid of a membrane protein since the glucose is a very big molecule.

t. Howdoes gas exchange occure in lungs?

Gas exchange is the delivery of oxygen from the lungs to the bloodstream, and the elimination of carbon dioxide from the bloodstream to the lungs. It occurs in the lungs between the alveoli and a network of tiny blood vessels called capillaries, which are located in the walls of the alveoli.

u.What is the role of diffusion in gas exchange?

The carbon dioxide concentration is much greater in your blood than the alveoli. So, by the rule of diffusion, the carbon dioxide moves from the blood to the alveoli, where it can be exhaled through the lungs. The same thing happens with oxygen. ... Oxygen diffuses into the blood from the alveoli.

v. What type of diffusion is gas exchange?

Gas exchange during respiration occurs primarily through diffusion. Diffusion is a process in which transport is driven by a concentration gradient. Gas molecules move from a region of high concentration to a region of low concentration.

w. Is oxygen diffusion is passive process?

Facilitated diffusion. Some molecules, such as carbon dioxide and oxygen, can diffuse across the plasma membrane directly, but others need help to cross its hydrophobic core. ... A concentration gradient exists for these molecules, so they have the potential to diffuse into (or out of) the cell by moving down it.

x. What gases are involved in gas exchange?

Gas Exchange Between Alveolar Spaces and Capillaries

The function of the respiratory system is to move two gases: oxygen and carbon dioxide. Gas exchange takes place in the millions of alveoli in the lungs and the capillaries that envelop them.

y. Fick's law equation

The basic equation for mass transfer by molecular diffusion is Fick's law which may be expressed as: N A = - d A B d C A d y. where N_A is the mass transfer rate per unit area (kmol/m^2s), C_A is the molar concentration of the diffusing component and D_{AB} is the molecular diffusivity.

z. What does Fick's first law mean?

Fick's first law

J measures the amount of substance that will flow through a unit area during a unit time interval.

A. What is Fick' second law?

Fick's 2nd law of diffusion

Consider diffusion at the front and rear surfaces of an incremental planar volume. Fick's 2nd law of diffusion describes the rate of accumulation (or depletion) of concentration within the volume as proportional to the local curvature of the concentration gradient.

B. What is the dimension of diffusion constant?

D is the diffusion coefficient or diffusivity. Its dimension is area per unit time, so typical units for expressing it would be m2/s. φ (for ideal mixtures) is the concentration, of which the dimension is amount of substance per unit volume. It might be expressed in units of mol/m3.

C. What affects of diffusion coefficient?

DIFFUSION COEFFICIENT. ... The diffusion coefficient is a physical constant dependent on molecule size and other properties of the diffusing substance as well as on temperature and pressure. Diffusion coefficients of one substance into the other are commonly determined experimentally and presented in reference tables.

1What is Avogadro' law and formula?

Avogadro's law's mathematical formula can be written as: V ∝ n or V/n = k.

Where "V" is the volume of the gas, "n" is the amount of the gas (number of moles of the gas) and "k" is a constant for a given pressure and temperature.

2.What is a mole 6.06×10^{23}

The mole (abbreviated mol) is the SI measure of quantity of a "chemical entity," such as atoms, electrons, or protons. It is defined as the amount of a substance that contains as many particles as there are atoms in 12 grams of pure carbon-12. So, 1 mol contains 6.022×10^{23} elementary entities of the substance.

3.What is 1mole in grams?

You can view more details on each measurement unit: molecular weight of In or grams The SI base unit for amount of substance is the mole. 1 mole is equal to 1 moles In, or 114.818 grams.

4.How many moles are 15 grams of lithium?

Approx 52 moles.

Explanation:

The atomic mass of Li is $6.94 \cdot g \cdot mol^{-1}$. $15 \cdot g 6.94 \cdot g \cdot mol^{-1}$ = ??mol.

**** All are collected from NET.**