**SCH3U: U5-L9 Date:**

**Unit 5 Gases and Atmospheric Chemistry: Review**

**Key Ideas**

* States of matter
  + Forces
  + Kinetic molecular theory
* Boyles law
  + Pressure and volume
* Charles Law
  + Temperature and volume
  + Kelvin
* Pressure temperature law
  + Pressure and temperature
* Combined gas law – can replace all three above
  + Pressure, volume, and temperature
  + Understand the relationships between temperature, pressure and volume.
* Idea gas Law
  + (These assumptions are not true in all cases especially with extreme temperatures and pressures. When we make calculations we pretend that it is a perfect world situation)
  + Volume-temperature and pressure temperature graphs are perfectly straight lines.
  + Gas does not condense to a liquid when it cools
  + Gas volume = 0 at absolute zero
  + pv = nRT
  + Gas particles have no volume
  + Gas particles do not attract each other
* Law of combining values
  + When measured at the same temperature and pressure, volumes of gaseous reactants and products of chemical reactions are always in simple ratios of whole numbers
* Avogadro’s theory
  + Equal volumes of gases at the same temperature and pressure contain equal numbers of molecules
* Molar volume
  + The volume that one mole of a gas occupies at a specified pressure and temperature.
    - VSTP = 22.4 L/mol VSATP = 24.8 L/mol

**Terms**

|  |  |
| --- | --- |
| * Absolute zero * Atmospheric pressure * Boyle’s law * Charles’ Law * Combined gas law * Combined gas law * Gas constant * Ideal gas | * Ideal gas law * Kelvin temperature scale * Kinetic molecular theory * Pressure * Pressure and temperature law * Molar volume * Partial pressure |

**Formulas**

|  |  |  |
| --- | --- | --- |
| **Type** | **Formula** | **Units** |
| Boyle’s Law | P1V1 =P2V2 | Pressure = kPa, mm Hg, atm |
| **Kelvin temperature** | TK=  tc  +  273.15  tc  =  TK  -  273.15 | K or °C |
| **Charles Law** | V1T2= V2T1 | Temperature = K  Volume = L |
| **Pressure and Temperature Law** |  | Pressure = kPa, mm Hg, atm  Volume = L |
| Combined gas law |  | Pressure = kPa, mm Hg, atm  Volume = L  Temperature = K |
| Ideal Gas law | R = **8.3143510  kPa L/mol K** |  |
| Dalton’s Law | **Ptotal = P1 + P2 + P3 +...** | Kpa |
| Molar Volume of gas |  | V = STP = 22.4 mol/L  V = SATP = 24.8 mol/L |
| Pressure conversions | mm Hg to kPa  given  kPa to mm Hg | 1 atm = 101.325kPa  1 atm = 760 mm Hg |

**Questions**

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