**Atomic Theory Formula Sheet:**

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| **Speed of Light:**$$c=3.0 x 10^{8} m/s$$ | $$c=λν E=mc^{2}$$λ – Wavelength $ν-$ Frequency $E-$ Energy |
| **Energy of a Photon:**$$h=6.626 x 10^{-34} J\*s$$ | $$E=hν E=\frac{hc}{λ}$$ |
| **The Photoelectric Effect:**$$E\_{0}-Work Function$$$$ν\_{0}-Threshold Frequency$$$$1eV=1.602 x 10^{-19} J$$$$1 nm=1 x 10^{-9} m$$$$KE=\frac{1}{2}mv^{2}$$ | **Kinetic Energy:**$$KE= E\_{photon}-E\_{0} $$$$KE=hν-hν\_{0}$$$$KE= \frac{hc}{λ}-E\_{0}$$**Maximum Wavelength Needed to Free an Electron:** $$λ\_{0}=\frac{hc}{E\_{0}}$$ |
| **Wavenumber:** (cm-1 or m-1) | $$\overbar{ν}=\frac{1}{λ}$$ |
| **De Broglie Wavelength:** | $$λ=\frac{h}{mv}$$ |
| **Photon Momentum:** | $$p=mv p=\frac{h}{λ}$$ |
| **Bohr Model of H atom:** | **Photon Energy:**$$E=-2.178 x 10^{-18} J \left[\frac{1}{n\_{F}^{2}}-\frac{1}{n\_{I}^{2}}\right]$$ |
| **Heisenberg’s Uncertainty Principle:** | $$Δx Δp \geq \frac{h}{4π}$$ |
| **Useful Data:** |

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| Subatomic Particle: | Rest Mass: | Atomic Mass Unit: |
| Electron | $$9.109 x 10^{-31} kg$$ | 0.000549 amu |
| Proton | $$1.6726 x 10^{-27} kg$$ | 1.007276 amu |
| Neutron | $$1.6749 x 10^{-27} kg$$ | 1.008665 amu |

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