CHEM 200 Exam/Quiz Information Sheet

Physical Quantities

atomic mass unit (amu) = 1.66056×10^{-27} kg
Avogadro's number = 6.022×10^{23}
universal gas constant (R) = 8.314 J/K·mol = 0.08206 L·atm/K·mol
absolute zero = -273.15 °C = 0 K
specific heat capacity of water ($c\mathrm{H_2O}$) = 4.184 J/g·K
speed of light (c) = 3.000×10^8 m/s
Planck's constant (h) = 6.626×10^{-34} J·s

Conversion Factors

1 angstrom (Å) = 10^{-10} m
1 atm = 1.01325×10^5 Pa = 1.01325 bar = 760 Torr
1 calorie = 4.184 J
1 joule = 1 kg·m^2/s^2

Equations

$PV = nRT$

$P_A = X_A \cdot P_{total}$

$$d = \frac{(\text{molar mass}) \times P}{RT}$$

$$u_{rms} = \sqrt{\frac{3RT}{\text{molar mass}}}$$

$\Delta E = q + w$

$\Delta H_{rxn} = \Sigma \Delta H°_f(\text{products}) - \Sigma \Delta H°_f(\text{reactants})$

heat capacity = $q/\Delta T$

specific heat capacity (c) = $q/(\text{mass} \times \Delta T)$

speed of light (c) = $\nu \times \lambda$

$$E_{photon} = h\nu = \frac{hc}{\lambda}$$

$$E_{electron} = -2.18 \times 10^{-18}\ \text{J} \left(\frac{Z^2}{n^2}\right)$$

$$\lambda = \frac{h}{mu}$$

$$\frac{1}{\lambda} = 1.096776 \times 10^7\ \text{m}^{-1} \left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right), \text{ where } n_2 > n_1$$