
Equations and Constants for Exam 1

The following equations and constants will be given on the last page of Exam 2. If you don't see something here that you have used, you should commit it to memory. Keep in mind that you may or may not use some of the equations/constants on the exam.

Equations:

$$\Delta H_{\text{rxn}}^{\circ} = \sum m\Delta H_f^{\circ}(\text{products}) - \sum n\Delta H_f^{\circ}(\text{reactants})$$

$$\Delta S_{\text{rxn}}^{\circ} = \sum mS_m^{\circ}(\text{products}) - \sum nS_m^{\circ}(\text{reactants})$$

$$\Delta G_{\text{rxn}}^{\circ} = \sum m\Delta G_f^{\circ}(\text{products}) - \sum n\Delta G_f^{\circ}(\text{reactants})$$

$$\Delta G = \Delta H - T\Delta S$$

$$E_{\text{photon}} = \phi + \text{KE}$$

$$\text{KE} = \frac{1}{2}mv^2$$

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

$$\Delta x \cdot m\Delta v \geq \frac{h}{4\pi}$$

$$\Delta E = -2.18 \times 10^{-18} \text{ J} \left(\frac{1}{n_f^2} - \frac{1}{n_i^2} \right)$$

$$\frac{1}{\lambda} = R \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right) \quad n_2 \geq n_1$$

Constants:

Planck's constant (h) = 6.626×10^{-34} J·s

Speed of light (c) = 3.00×10^8 m s⁻¹

Avogadro's number (N_A) = 6.022×10^{23} mole⁻¹

Mass of electron (m_e) = 9.11×10^{-31} kg

Rydberg's constant (R) = 1.0967×10^7 m⁻¹

Gas Constant: R = 0.0821 L·atm/(mole·K)

$$k = 1.38 \times 10^{-23} \text{ J/K}$$

$$1 \text{ atm} = 760 \text{ torr}$$

- Any heat capacities needed except H₂O (l)
- Any ΔH_{fus} , ΔH_{vap} values needed
- Any ΔH_f° and ΔG_f° values needed except those for elements in their standard states
- Any S^o values needed