The Equation Sheet

Constants:

Avogadro's Number (N_A)	6.02×10^{23}
Universal Gas Constant (R)	8.314 J/mol K
Planck's constant (h)	6.626×10^{-34} J s
Rydberg Constant	2.18×10^{-18} J
Speed of light (c)	3.00×10^{8} m/s

Conversion Factors:

1A = 1 C/s
1C = 1 J/V mol
1 L atm = 101.3 J
1 nm = 10^{-9} m
1 atm = 760 torr
= 760 mm Hg

The Equations

$q = mc\Delta T$

$q = C\Delta T$

$\Delta H = (-)Q/mol$

$\Delta H^o_{rxn} = \Sigma \Delta H^o_f$ (products) - $\Sigma \Delta H^o_f$ (reactants)

$\Delta G^o_{rxn} = \Sigma \Delta G^o_f$ (products) - $\Sigma \Delta G^o_f$ ((reactants)

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

$\Delta G^o = - RT\ln K$

$\Delta G = \Delta G^o + RT \ln Q$

$\Delta G^o = -nF E_{cell}$

$\Delta S^o_{rxn} = \Sigma \Delta S^o_f$ (products) - $\Sigma \Delta S^o_f$ (reactants)

$\ln(k_2/k_1) = E_a/R\ (1/T_1 - 1/T_2)$

$[A] = -kt + [A]_o$

$1/[A] = kt + 1/[A]_o$

$\ln[A] = -kt + \ln[A]_o$

$K_p = K_c (RT)^{\Delta n}$

$pH = -\log [H_3O^+]$

$K_w = K_a \times K_b$

$pK_a + pK_b = pK_w$

$pK_a = -\log K_a$

$pK_b = 14 - pK_a$

$pH + pOH = 14$

$pOH = -\log [OH^-]$

$pH = pK_a + \log$ ([conjugate base]/[acid])

Charge = Current x Time

$E^o_{cell} = E^o_{cathode} - E^o_{anode}$

$E^o = (0.0582/n)\log K$

$E = hc / \lambda$

$c = \lambda v$

$\Delta E = R_H(1/n_i^2 - 1/ n_f^2)$

$E = hf$

$t_{1/2} = 0.693/k$