Some Review Material for Exam 2

Equations that will be given to you:

$\Delta G = -nFE = -RT \ln(K)$

$F = 9.64853415 \times 10^{4}$ C mol^{-1} $\quad$ $N = 6.022 \times 10^{23}$ mol^{-1}

$R = 8.314472$ J mol^{-1} K^{-1} $\quad$ $h = 6.626 \times 10^{-34}$ J s

All needed half-cell potentials and half reactions (but you may need to derive the needed values by combining some of the given values)

$$E = h\nu = \frac{hc}{\lambda}$$

$$\frac{[X]}{[X]+[S]} = \frac{A_X}{A_{S+X}}$$

$$n\lambda = d(\sin\theta - \sin\phi)$$

Equations and information you need to know that will not be given:

How to handle uncertainty (the same material as for exam 1)
The expressions for K_w, K_a, and K_b.
The relationship $K_w = K_a \bullet K_b$
How to write equilibrium constant expressions for solubility & acid-base problems
The *p* function and the definition of pH
The Henderson-Hasselbalch equation: $pH = pK_a + \log\frac{[base]}{[acid]}$
How to handle titration data for acid-base and redox systems
GER and *LEO* (*g*ain *e*lectrons → *r*eduction, *l*ose *e*lectrons → *o*xidation)
The rule of vowels: *a*node → *o*xidation, *c*athode → *r*eduction
How to interpret and write line notation for electrochemical cells (anode always written on the left)
The Nernst equation: $E = E^{\circ} - \frac{0.05916}{n}\log(Q)$ (at 25 °C)
$E_{cell} = E_{+} - E_{-}$, where E_{+} is the potential on the cathode, E_{-} the potential on the anode
How ion selective electrodes work (in general), with emphasis on the glass pH electrode
Sources of error in using electrodes, especially pH electrodes
How redox indicators work
Beer's Law, A = εbc
How to do multicomponent analyses using Beer's Law
How a spectrophotometer works
What components are needed for spectroscopic instruments
Reactions we used in the lab experiments