Review for the first quiz

The quiz will cover material from lecture, lab, and the textbook. I anticipate the quiz will take 1-2 hours for you to complete and will be followed by time for you to work on your metamorphic rocks lab (no lecture). The quiz is worth 50 points (half of what a lab is worth); the quizzes are meant to keep you on track in this course so take this opportunity to catch up with and really understand the course material while studying for the quiz.

What you will be given or to which you will have access
Any IUGS igneous rock classification diagrams that you will need
Optical mineralogy texts (you may not use the texts with photomicrographs of minerals — e.g., Deer, Howie & Zussman, Kerr or Nesse)

What you will need to know for the quiz
Know which optical mineral properties are identified in plane polarized light (PPL) and with crossed polars (XPL)
Understand and be able to explain basic optical mineralogy
Identify all common major and minor (but not trace) igneous minerals using a petrographic microscope (olivine, clinopyroxene, orthopyroxene, hornblende/amphibole, biotite, muscovite, quartz, feldspar, chlorite, glass)
Be able to use the Michel-Levy method (if given the correct chart) to determine plagioclase composition using albite twins
Recognize twinning (and name the kind of twinning) and exsolution lamellae, and reaction rims in thin section
Be able to use a modal analysis of a rock (percentages of various minerals in the rock) to name the rock using the appropriate IUGS classification diagram
Distinguish between felsic, intermediate, mafic, and ultramafic igneous rocks in hand sample and in thin section (igneous classification)
Distinguish between volcanic and plutonic rocks in hand sample and in thin section (igneous textures)
Be able to describe a hand sample of igneous rock, determine its mineralogy, and name it
Be able to estimate modal percentages of igneous minerals in thin section (± a few percent) and name the rock
Be able to interpret and explain 2-component phase equilibria diagrams (solid solutions like An-Ab and Fo-Fa) and binary eutectic diagrams (like An-Di)
Be able to relate a phase equilibria diagram to Bowen’s reaction series and the evolution of magmas
Composition of the crust and mantle
How heat and pressure increase with depth in the earth
Geothermal gradients and sources of heat in the earth
Know what partial melting and fractional crystallization are and describe a natural case in which these processes might occur
Understand Bowen’s reaction series
Granitoid classification and their tectonic settings — where do you expect to find them and what composition should they have in those tectonic settings

What you may bring with you to the exam
One 8.5x11” sheet of paper with notes (on both sides if you wish)
Any optical mineral identification tables or texts (no photomicrographs – see above)