Geology 420 Mineralogy Final Exam Example Questions
North Dakota State University
Fargo, ND

The final exam is cumulative. Examples of types of questions follow.

Make up some questions of your own as practice!

Short Answer

- The characteristic symmetry of the (choose your favorite) crystal system.
- X-ray diffraction analysis of a metamict zircon would show what information about its crystal structure?
- Solid solution behavior of orthoclase and albite at high vs. low temperatures.
- Phase transition behaviors and phase diagram for (your favorite mineral).
- Symmetry operations
- Miller indices and their relation to XRD analysis

Diagrams

- For a given phase diagram, name the stable mineral assemblages (and their formulae) at labeled points, including locations within miscibility gaps.
- Relate observed morphologies of minerals (forms) with their point groups.
- Draw schematic mineral structures using conventions such as T and O layers.
- For the plagioclase system, cooling and crystallization scenarios.

Reactions

- For metamorphism of a sequence of sediments, write balanced reactions for scenarios, such as:

dolomite + quartz sandstone + H_2O → talc + calcite + fluid.
talc + calcite → tremolite + dolomite + fluid.
tremolite + calcite + quartz → diopside + fluid.
diopside + dolomite → forsterite + calcite + fluid
(think of some more on your own)

Other

- Physical properties and their relation to form and crystal structure

- Environments of ore mineral formation
- Uses of minerals we have studied
- Chemical analytical methods
- Recalculation of a mineral analysis to a mineral formula

Sample Questions

Forms of a specimen of the mineral hydroxy-apophyllite were described in a recent article as a combination of {110} first order prism, with {001} and {111} terminations. The space group is P_4/mnc. Neatly sketch a crystal morphology that would be consistent with the description. Label the axes with the appropriate axes and form designations.

Under what geologic conditions does pigeonite typically form?