

GEOSCI-311 Mineralogy Fall 2008 EXAM 1 REVIEW

- 1) Introductory concepts in Mineralogy
 - a) Definitions of a mineral
 - b) Basic crystal and optical classes
 - c) The major rock forming minerals and their chemical compositions
 - d) Preliminary concept of balancing mineral formulas
- 2) Basic rock forming environments
 - a) Tectonic settings for major minerals
 - b) Components of common rock-types
 - c) Role of pressure and temperature in igneous and metamorphic systems
- 3) Characteristics of minerals in HAND SAMPLE
 - a) General mineral properties
 - b) Qualitative properties (i.e. color, luster, streak, fracture)
 - c) Semi-quantitative properties (i.e. hardness, specific gravity)
 - d) Crystal shape, form & habit (including cleavage, parting, and twinning)
- 4) Crystal chemistry
 - a) Structure of atoms
 - b) Making ions (differences and roles of cations and anions)
 - c) Types of bonds and their relative roles and strengths
 - d) Chemical substitution and color in minerals
- 5) Crystallography and symmetry
 - a) 2D vs. 3D space
 - b) Types of symmetry operations in 2D and 3D
 - c) 6 major crystal systems (i.e. Isometric, tetragonal, etc.)
 - d) Concepts of projections (i.e. plotting with a stereonet)
 - e) Planar point groups and plane lattices
 - f) Space lattices and space groups
- 6) Optical Mineralogy
 - a) Plane vs. polarized light in minerals
 - b) Wave theory
 - c) Refractive index, wavelength and the Becke Line
 - d) Optical classes
 - e) Birefringence, Interference colors, and retardation
 - f) Introduction to interference figures (i.e. uniaxial vs. biaxial)
- 7) Major silicate structures
 - a) Tectosilicates (Framework)
 1. Feldspar group
 2. Quartz
 - b) Phyllosilicates (Sheet silicates)
 - c) Inosilicates (Chain silicates)
 1. Amphiboles
 2. Pyroxenes
 - d) Cyclosilicates (Ring silicates)
 - e) Sorosilicates (Disilicates)
 - f) Nesosilicates (Orthosilicates)