

National Exams December 2018

**18-Geol-A1, Mineralogy and Petrology**

3 hours duration

**NOTES:**

1. If doubt exists as to the interpretation of any question, the candidate is urged to submit with the answer paper, a clear statement of any assumptions made.
2. This is an CLOSED BOOK EXAM. No calculator is permitted.
3. There are *two parts* to this exam: **PART 1:** Short Answer (~ 1/2 page, each question). Answer all 5 ten-mark questions (50 marks). **PART 2:** Short Answer (~ 1 page, each question): Answer 5 of the 7 ten-mark questions (50 marks). The first ten questions as they appear in the answer book will be marked.

**PART 1:** Short Answer (~ 1/2 page, each):  
Answer all 5 ten-mark questions (50 marks).

- 1) Amphibole and Pyroxene are two silicate mineral groups. Giving a mineral example (i.e., name) of each, please explain how these mineral groups are different.
  
- 2) Fe, Cr, Ti, U, and Cu are common in oxide minerals. List one mineral name and chemical formula for examples of minerals containing these elements.
  
- 3) What kind of evidence would determine if any of the following processes have changed the composition of magmas and resulting igneous rocks (a) crystal fractionation, (b) magma mixing, (c) crustal assimilation.
  
- 4) There are 7 crystal systems in mineral crystallography. Name and describe 2 of these crystal systems.
  
- 5) What is dynamic metamorphism? What key mineral and textural features would you anticipate seeing in this type of metamorphism?

**PART 2:** Short Answer (~ 1 page, each):  
Answer **5 of the 7** ten-mark questions (50 marks):

- 1) Lava flow are sensitive to changes in composition, temperature, viscosity and proximity to vents. Elaborate and explain.
- 2) What are ignimbrites and how are they formed?
- 3) What is metasomatism? Skarns form during metasomatism, please explain what they are and how they relate.
- 4) What causes melting to occur in different tectonic settings? Please use two different tectonic environments to explain.
- 5) Effusive vs Explosive eruptions. Give an example of each and contrast the products? Name a place on Earth where you might find each of these products.
- 6) What is Bowen's Reaction series? Please explain how different igneous rocks are created using Bowen's Reaction series.
- 7) Carbonate minerals are common on Earth. List two minerals (i.e., names) in this group. Give the mineral formula for each and a diagnostic property for the identification of each (i.e., how can you tell them apart?).