



The American University of Beirut
Final Examination



Petrology (221)
Department of Geology
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Jan. 29, 1997
Time: 2 hours
Exam rules apply

Part I

Answer all questions in Part I

(MARKS)

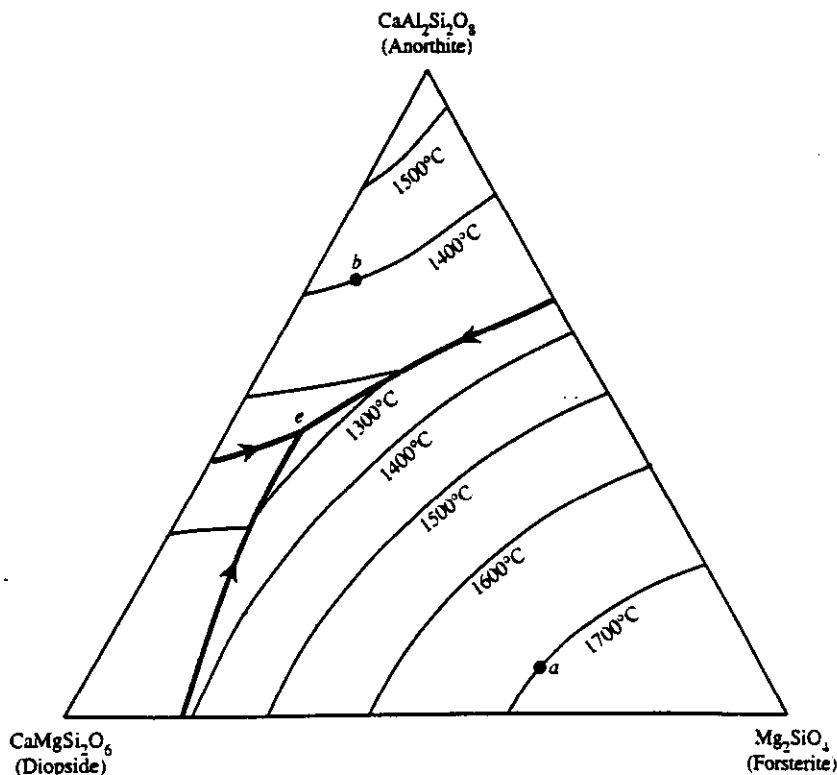
- (15) 1. (a) Describe the following textures, and comment on their origin:
- | | |
|---------------------------|------------------------|
| i) Corona texture | ii) Myrmekitic texture |
| iii) Graphic texture | iv) Mylonitic texture |
| v) Poikiloblastic texture | vi) Ophitic texture |
- (b) What textural evidence do you expect to see under the microscope to indicate a equilibrium crystallization origin of a rock?
- (15) 2. (a) Concisely describe or define the following terms:
- | | |
|----------------------|-----------------------|
| i) Aplite | ii) Cryptic layering |
| iii) Migmatite | iv) Isograd |
| v) Melanocratic rock | vi) Helicitic texture |
| vii) Lever rule | viii) Network formers |
- (15) 3. (a) What is the alkali lime index?
- (b) Do you expect to find a special type of gneiss produced as a result of metamorphism within the zeolite facies conditions? Why?
- (c) The process of "magmatic stoping" is an important process for magma emplacement? Describe this process.
- (d) Name two minerals that are most characteristic of the low pressure part of the amphibolite facies, and two other most characteristic minerals of the high pressure part of the same facies.
- (15) 4. Briefly describe the mineralogical, chemical, and textural characteristics of the following rocks:
- Sillimanite garnet gneiss
 - Carbonatite
 - Kimberlite
 - Aegirine syenite
 - Blue schist rock



Part II

Answer only two out of three questions in Part II

- (10) 5. Certain metamorphic minerals including pyrophyllite, biotite, staurolite,, and orthoclase form during progressive metamorphism of pelitic rocks. Write the metamorphic reactions which produce each of these mineral phases, and show the location of each reaction on a P-T grid.
- (10) 6. Use the phase diagram given below to; i) Label point "e", and all fields and curves, ii) Give the mineralogical composition of a melt at point "b", iii) Describe the crystallization path of a melt of composition "a", and iv) Name the rock produced by cooling at the end of the process.



- (10) 7. To what metamorphic facies (and zone) do the following mineral assemblages belong? Indicate the type of composition the assemblage is by plotting it (each mineral assemblage in a, b, and c) on the appropriate ACF, AKF, or AFM diagram;
- (a) Qtz-oligoclase-staurolite-almandine-mus-biot
 - (b) Qtz-albite-epidote-actinolite-chlorite
 - (c) Qtz-plagioclase-cordierite-biot-mus
 - (d) pyrope-omphacite-jadeite