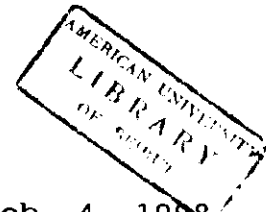




The American University of Beirut
Final Examination



Petrology (Geol 221)
Department of Geology
Dr. A.M. Abdel-Rahman

Feb. 4, 1998
Time: 2 hours
Exam rules apply

Answer any five of the following six questions

(MARKS)

(15)

1. Define the following terms:
- | | |
|-----------------------|----------------------|
| a) Normative minerals | b) Orthocumulate |
| c) Holohyaline | d) The solvus |
| e) Isograd | f) Poikiloblasts |
| g) Metamorphic facies | h) Mylonitic texture |

(15)

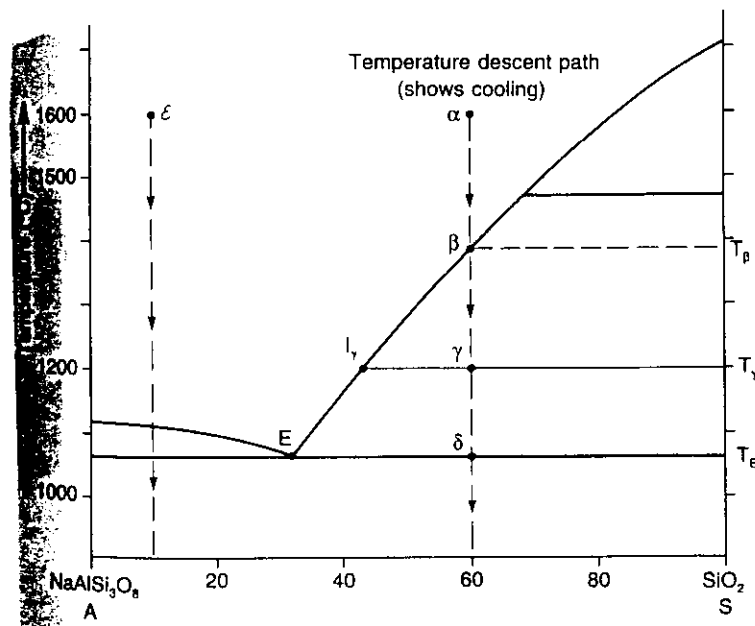
2. (a) Layered intrusions: Describe these igneous bodies and discuss their origin. Name two of such intrusions.
- (b) Define a "peralkaline rock" geochemically, and mineralogically.
- (c) What is meant by these terms "subsolvus granite" and "melanogranite".

(15)

3. Write an essay on "metamorphism of carbonate rocks", given that the composition of the protolith is siliceous dolomitic limestone. Your essay should include reactions producing the various metamorphic minerals that form during progressive metamorphism of these rocks.

(15)

4. Use the phase diagram given below to:
- a) Label all fields, curves, lines, and point "E" directly on the diagram.
- b) Describe in detail the equilibrium crystallization path of a melt of composition " α ", and give the proportions of the various phases and their compositions at temperature T_B , T_γ , and T_E .



(15)

5. a) Anatexis is an important petrogenetic process leading to the generation of some granitic magmas; Explain-, and provide evidences in support of this process.

b) Write a metamorphic reaction that lead to the formation of almandine, and another that produce staurolite.

c) Use the mineral assemblages given below to indicate the type of composition the assemblage is by plotting each assemblage on only one appropriate ACF, AKF, or AFM diagram. Indicate to which Barrovian zone each assemblage belong:

- (i) Qtz-orthoclase-almandine-biot-sillimanite
- (ii) Qtz-epidote-albite-tremolite-chlorite

(15)

6. Label all fields directly on the P-T grid provided (Figure 1). Within each field, write the three most characteristic minerals of each metamorphic facies.

