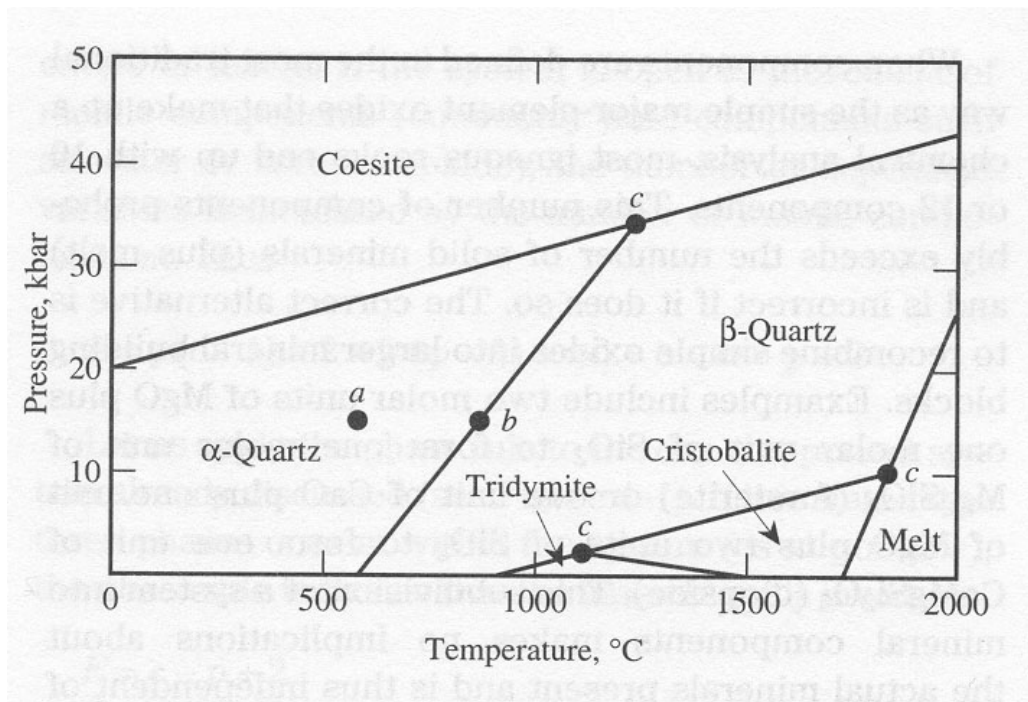


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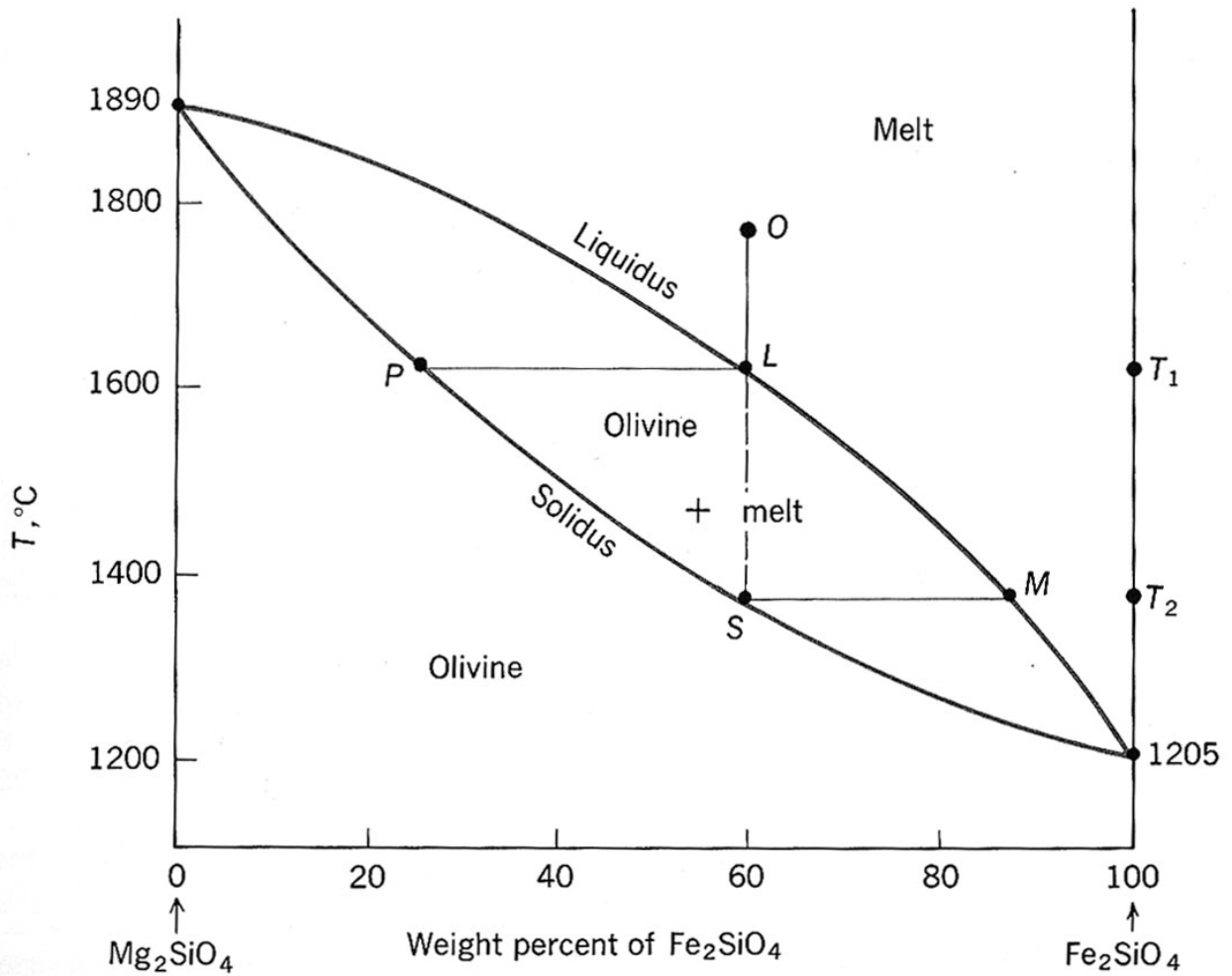
**GSCI 320: Petrology**  
**Spring 2005**  
**Exam #1: Phase Diagrams**

1) Answer the following questions for the phase diagram below:



- What chemical component(s) are portrayed in this phase diagram?
- What phases are portrayed on this phase diagram (the whole diagram)?
- Apply the Phase Rule at point "b". Show your work. What is the significance of your result?

2) Answer the following questions for the phase diagram below:



a) Describe the equilibrium crystallization of composition O. Apply the lever rule at 1450°C.

b) Briefly describe how fractional crystallization differs from equilibrium crystallization in this system.

3) Answer the following questions for the phase diagram below:

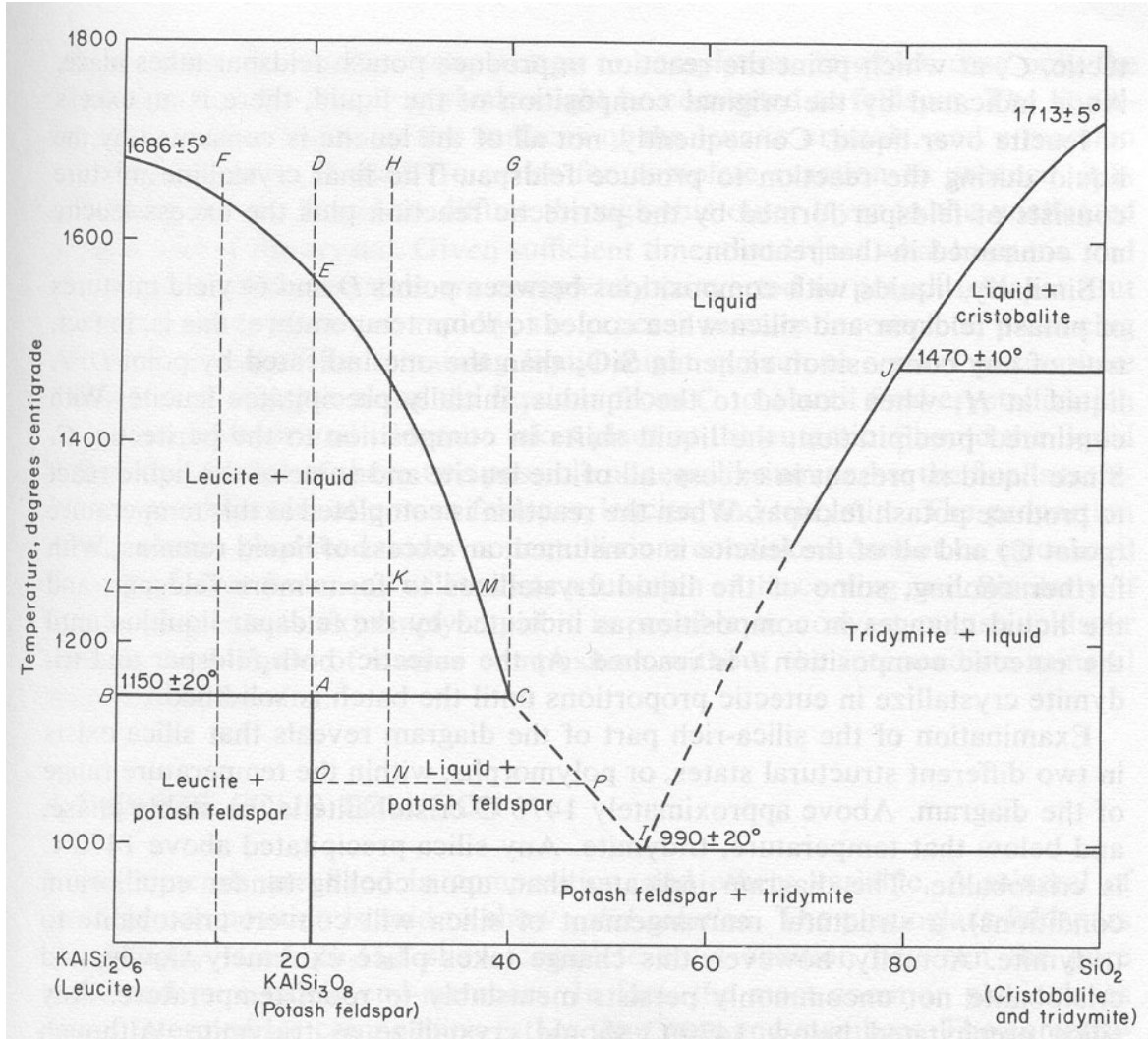


FIGURE 6  
The binary system  $\text{KAlSi}_2\text{O}_6\text{--SiO}_2$ . [After Schairer and Bowen (1948).]

- Under conditions of equilibrium crystallization of composition G, what phases are present at 1500°C? At 1100°C? At 900°C?
- What solid phases are produced during fractional crystallization of composition F between 1100°C and 950 °C?
- What happens at 1150°C under conditions of equilibrium crystallization? How is this reaction different for bulk compositions F and H?

- 4) Describe (as fully as possible) the equilibrium crystallization of composition "x". Be sure to trace and clearly label the liquid and total solid paths.

