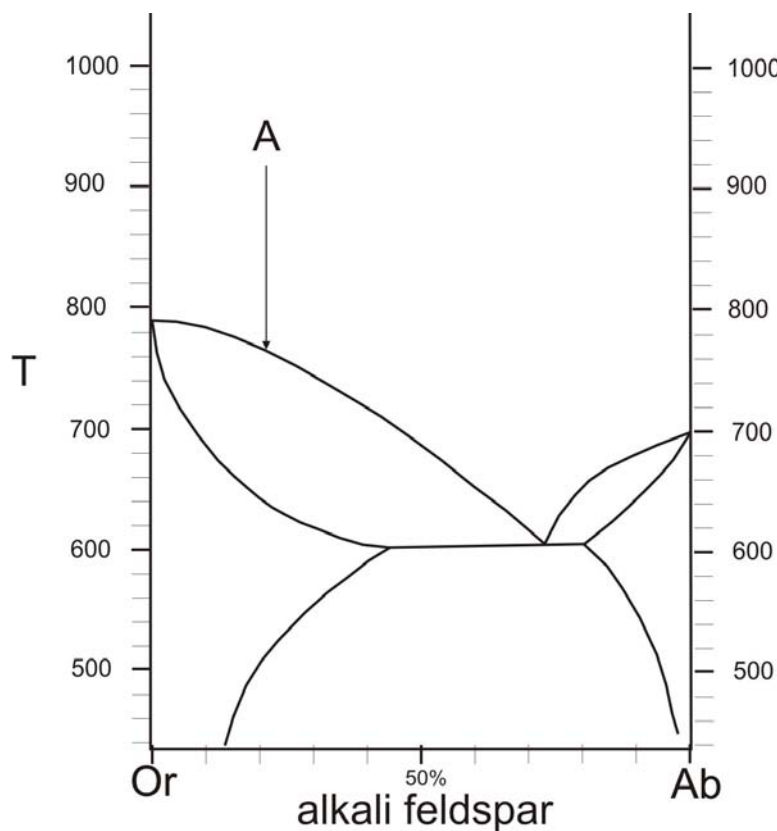


name _____

Phase Diagram Exam



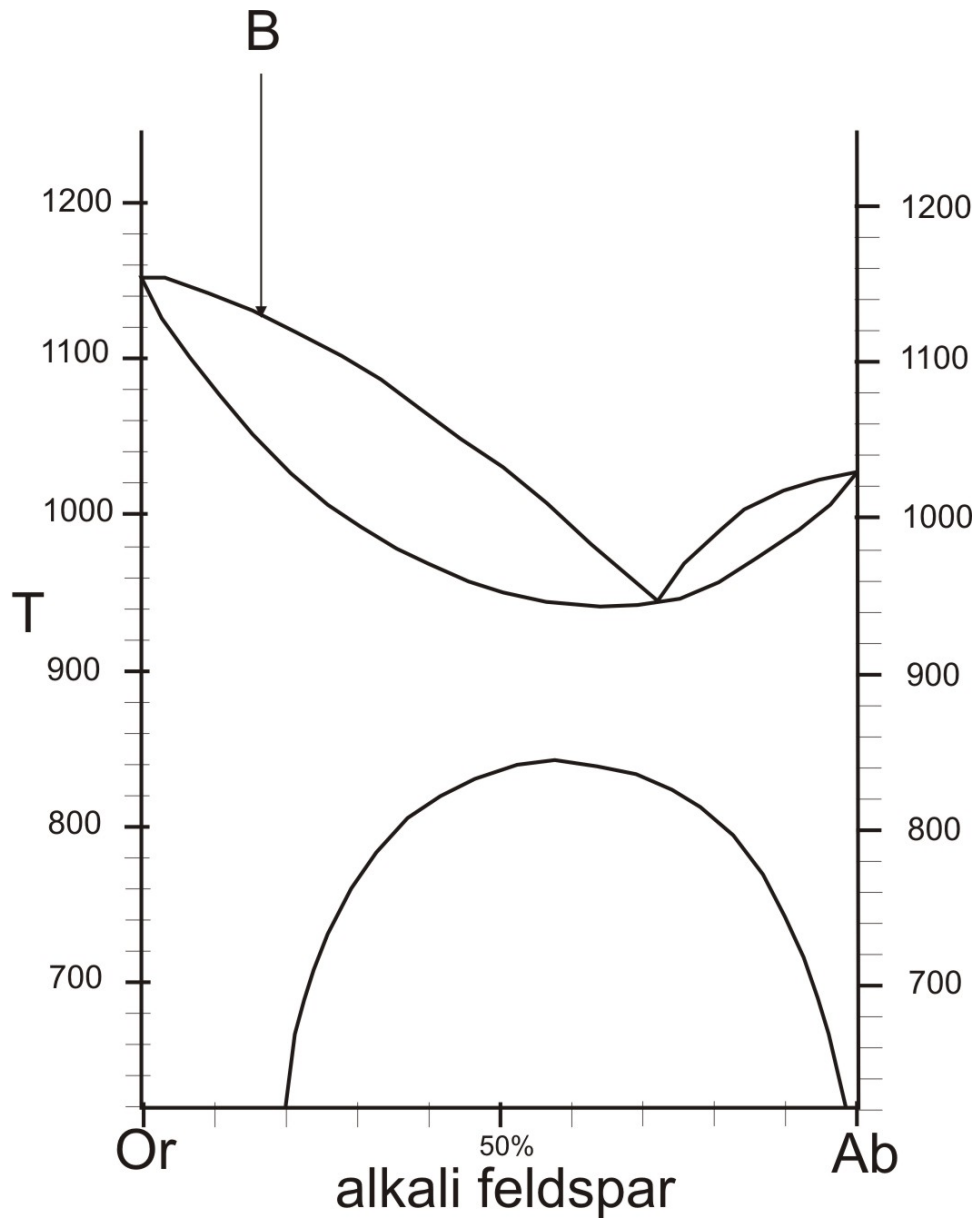
1. On the diagram shown, label the eutectic.

2. For composition A, at what temperature will crystallization begin? _____

3. For composition A, at what temperature will the last drop of melt disappear? _____

4. What will be the composition of the last drop of melt?

5. If crystallization goes to completion and everything stays in equilibrium, what will the result? You may wish to consider the following as you answer this: How many feldspars? What compositions? What textures? Etc.

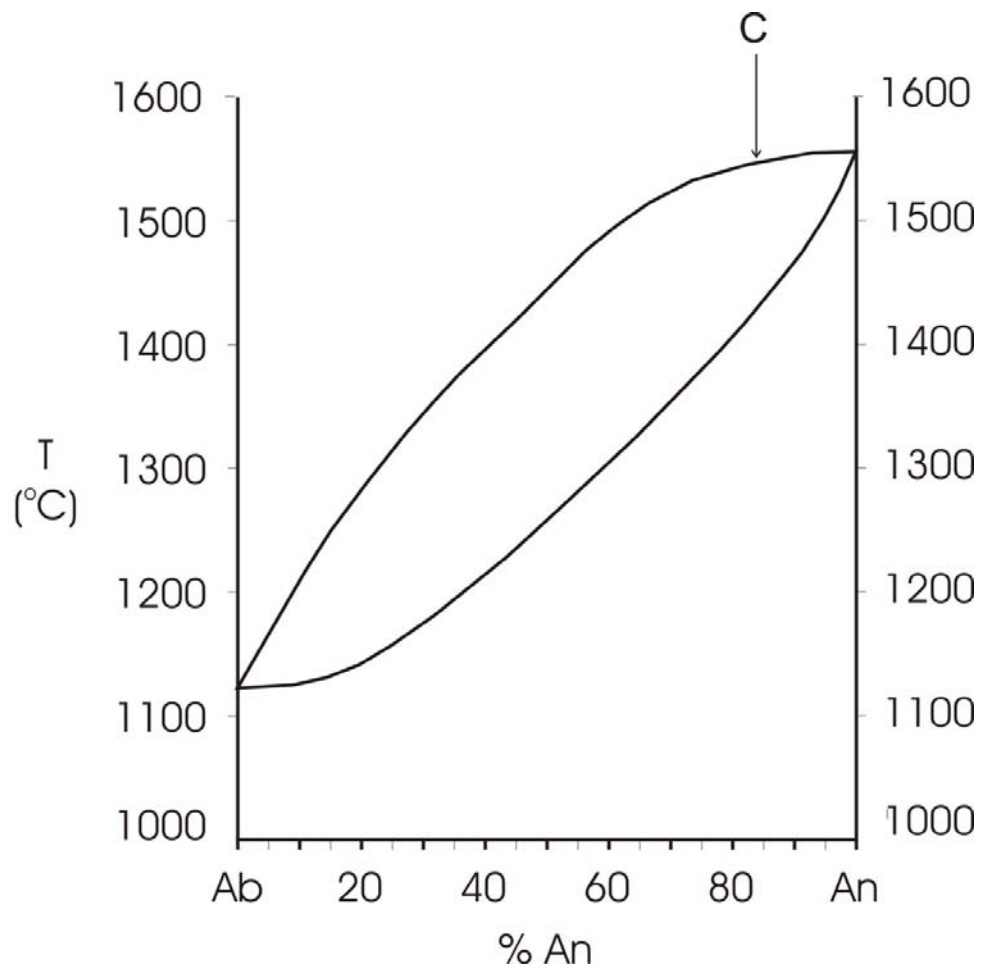


6. For composition B on the diagram at left, at what temperature will crystallization begin? _____

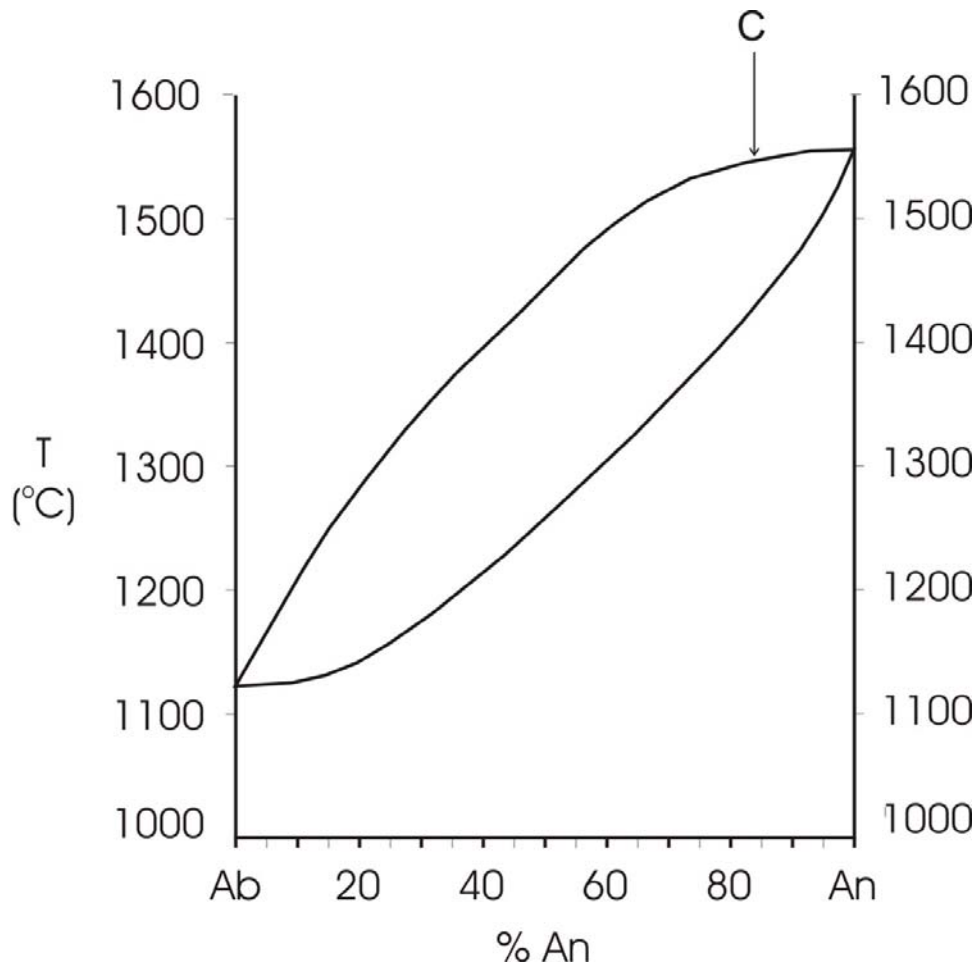
7. For the same composition, at what temperature will everything be solid? _____

8. What will be the composition of the last drop of melt? _____

9. Assuming everything goes to equilibrium, what will be the result after temperature has cooled to room temperature?



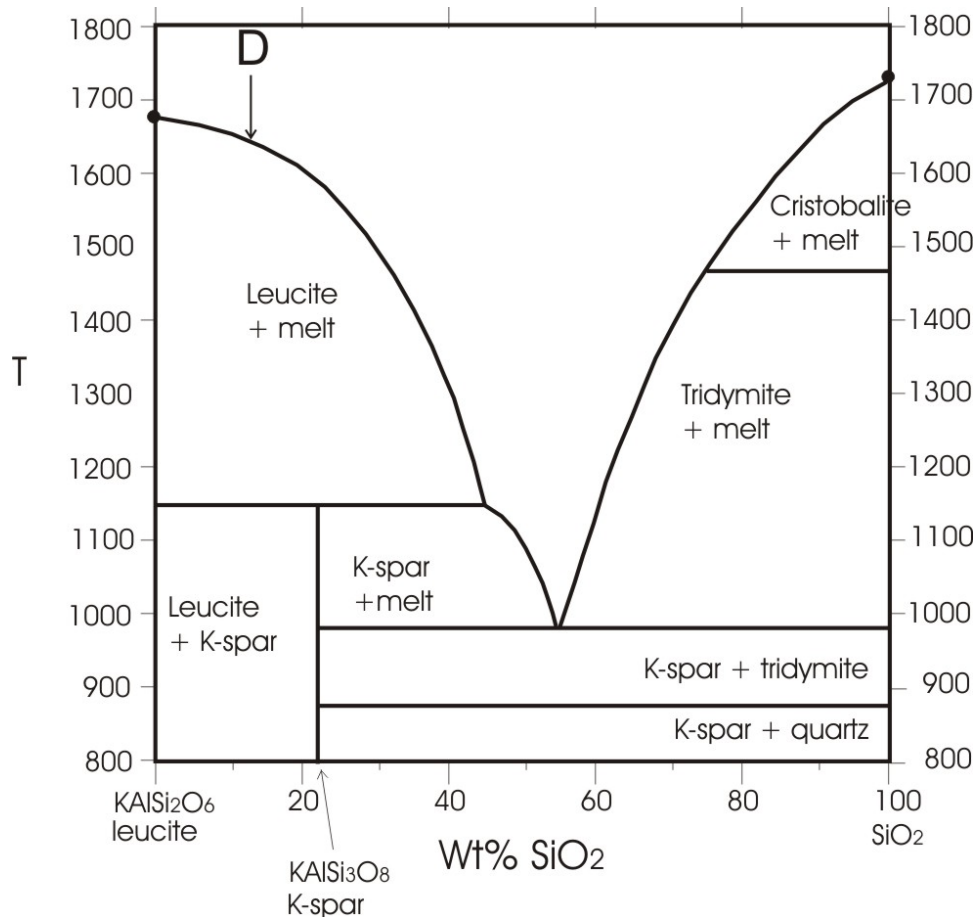
10. For composition C, above, what will be the composition of the first crystals to form?
11. What will be the composition of the last crystals to form?
12. At what temperature will the proportion of crystals:melt be 50:50?



For composition C, shown here, suppose we have a real messed up system involving the formation of cumulate layers. Every time a few feldspar crystals form, they settle to the bottom of the magma chamber and can no longer react with the melt. So, we get lots of thin layers of feldspar.

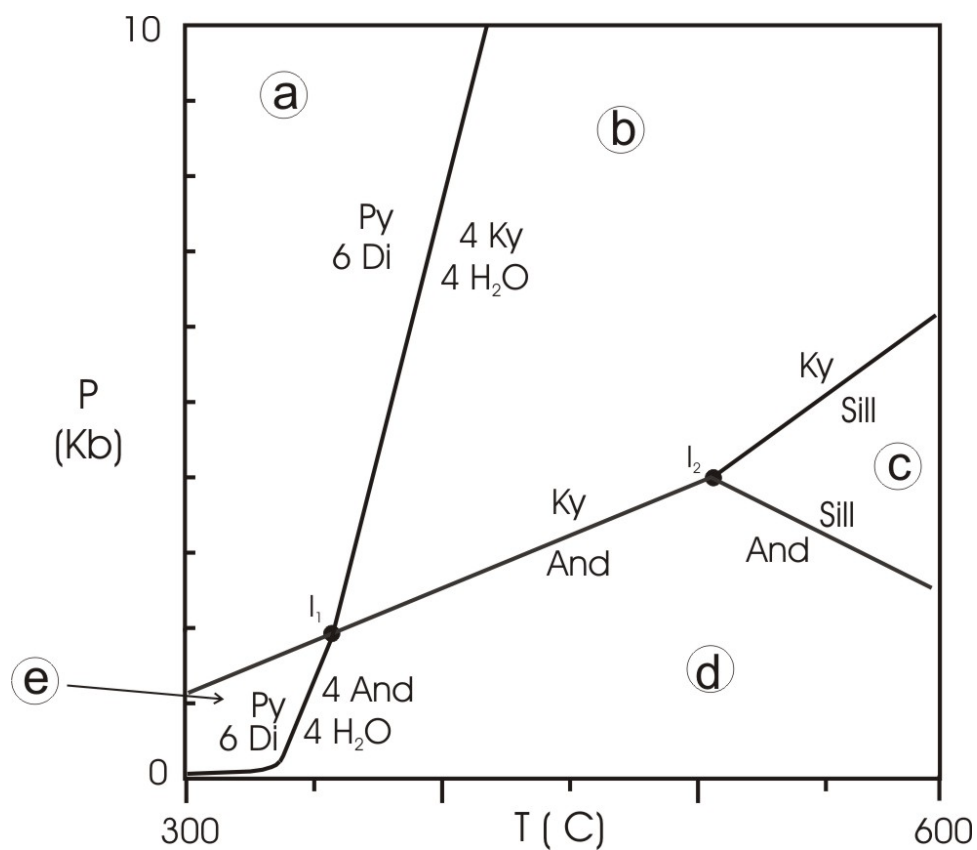
12. Make a drawing showing what the chamber would look like, showing the different cumulate layers and explain how the layers are different.

13. What will be the composition of the last drop of melt?



14. If a melt of composition D is allowed to cool completely and crystallize, what will the resulting rock contain? Name the mineral(s). If more than one, what proportions of each will it contain?

15. Suppose you find a rock that contain large euhedral crystals of K-spar surrounded by interstitial anhedral quartz. In the center of the K-spar crystals there are small inclusions of leucite. Draw an arrow on the above diagram that shows a composition and cooling path that might produce such a rock.



16. Where on this diagram are the following minerals and assemblages stable? (Use letters to indicate the zones on the diagram.)

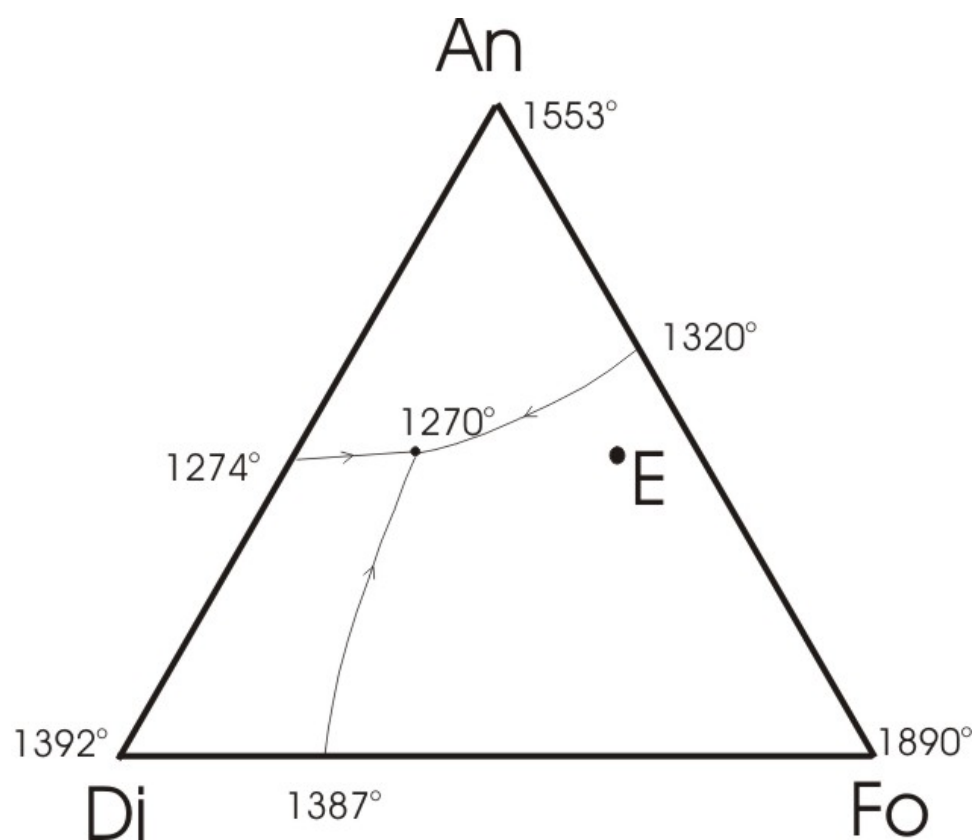
kyanite

diaspore

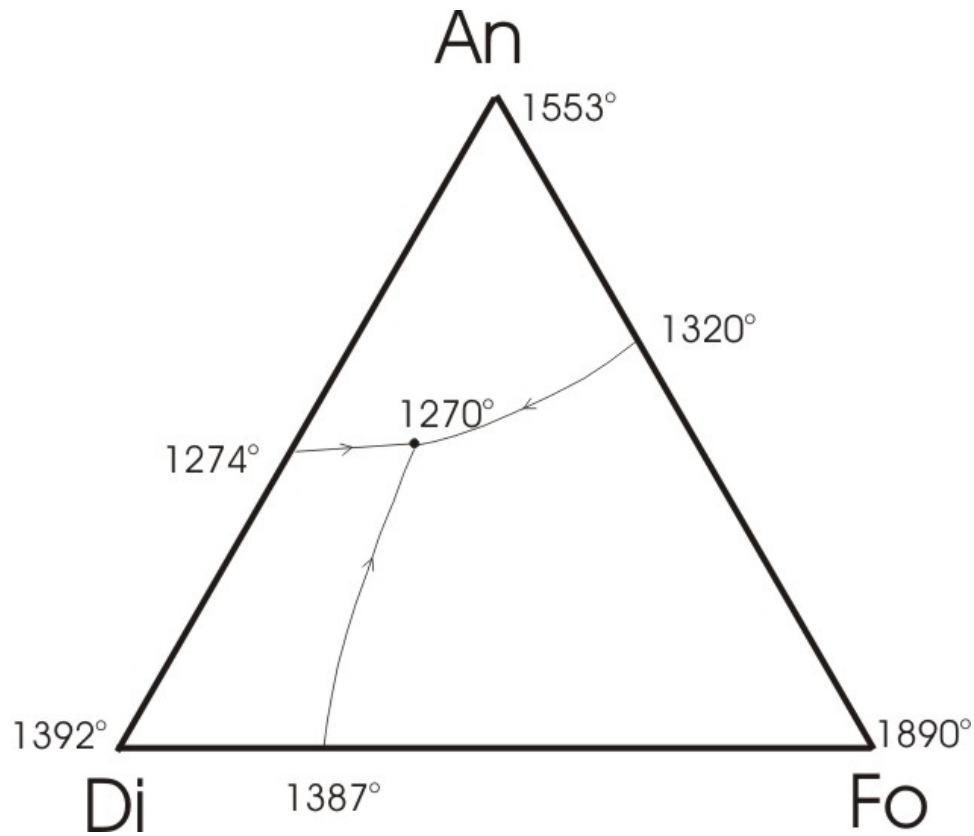
pyrophyllite + diaspore

pyrophyllite + diaspore + andalusite

17. What minerals may coexist together at the invariant point labeled I_2 ? (Careful – there may be more than one answer.)



18. Suppose you have a **rock** that has composition E and contains a mix of Di, An and Fo. You heat it up. Describe what happens as it melts. What will be the composition of the first melt to form? Will all the mineral disappear at once, or will they go in some order? If they all disappear at once, explain why? If not, in what order will they disappear? What will be the final composition of the melt?



Ignore point E for this question.

19. Label any eutectics, peritectics or cotectics that are on the diagram.

20. Suppose you have a melt that is 10%Fo-20%An-70%Di. Show on the diagram how the melt composition changes during crystallization.