

## Exam AMP&M 2011

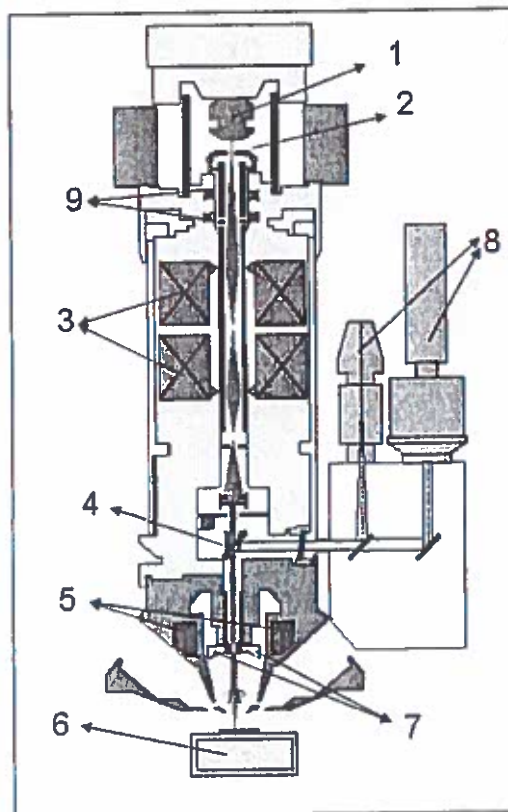
- 1)
  - A) What is geothermobarometry?
  - B) What are the important assumptions in geothermobarometry? Give some examples.
  - C) Describe (minimal) two important large scale geological applications in which geothermobarometric analyses have played an important/dominant role
  - D) You have performed various chemical spot-analyses on two adjacent, different, chemically-zoned minerals (A and B). What are the most important geometrical constraints that you have to describe in order to do proper geothermobarometric calculations. Give an example of it.
  
- 2)
  - A) Give a definition of ultra-high pressure metamorphism?
  - B) What are the thermodynamic forces driving metamorphism?
  - C) What are the major physical processes responsible for metamorphism?
  - D) Give a definition of the rock association. Present an example.
  - E) What is the difference between mineral-assemblage and mineral paragenesis?
  - F) What is the difference between a petrogenetic diagram and a metamorphic facies diagram?
  
- 3) 


A new UHP tectonic lens has been discovered in between Caledonian basement rocks of the Lofoten, northern Norway. The tectonic lens is referred to as the Hågeneset lens. The dimensions of the lens are 1km x 300 m; the dominant foliation dips 30° towards the west.

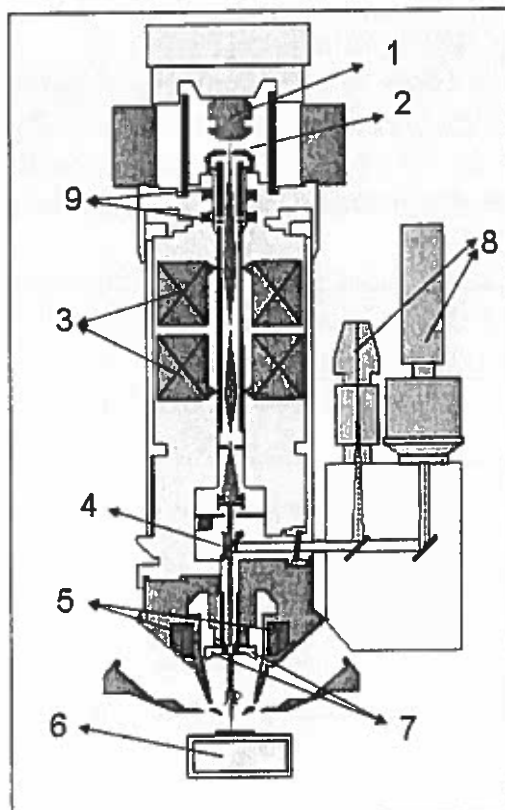
You are (very?) interested in this tectonic lens and would like to do your master thesis on this topic (=one year project). To do so you have to convince financial authorities to give you some money to do this project.....

  - A) Write a research proposal to do this work. Restrict yourself only to the research part (no logistics/finances etc). Describe what, why and how you would like to do this research? Incorporate also in your proposal the type/name of the research instruments you would like to use during your research.  
*Restrict your proposal to less than 300 words!*
  - B) Describe the various geodynamic models capable to explain the occurrence of UHP metamorphic minerals in rocks from orogenic terranes? Give each model a name and explain their mutual difference(s?) in terms of UHPM.

- C) What would you do to investigate what model, described in 3B, is applicable to your future research area (described in 3A)
- 4) Take one thin section out of the box available in the front of the class room. Write down the number of this thin section on your exam paper at the start of question 4. Look carefully to this number because an incorrect number will simply mean that you will get zero exam-points for this question.
- Describe the mineralogy present in the thin section.
  - Describe the microstructure.
  - Make a paragenetic diagram.
  - Give the rock a metamorphic name
  - Give the rock a (approximate) bulk rock chemical name.
- 5) Below a cross-section through an electron-optical instrument is given. Answer the following questions:
- What can you do with the instrument?
  - Describe the various parts, including their function, indicated by arrows/numbers 1 → 9
  - Define spot size
  - Define interaction volume
  - Define sample current
  - Define magnification of the instrument
  - Define resolution of the instrument



- C) What would you do to investigate what model, described in 3B, is applicable to your future research area (described in 3A)
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- subduction - m43p      clunk tectonics  
- s23p      melange model  
• kimberlites

more!

