GLY261 Practicals 5 & 6: Basalts

Name: _____ Student Number:_____

Part 1: Thin section descriptions
Take two thin sections of basalt from those offered in the microscope laboratory.

Section 1

1. What is the section name? _____
2. How much glass is present in the section? _____ **%**
3. What other minerals can be identified, and what is the average size of each crystal?

   Mineral 1: _____ _____ % Size:_____
   Mineral 2: _____ _____ % Size:_____
   Mineral 3: _____ _____ % Size:_____
   Mineral 4: _____ _____ % Size:_____
   Mineral 5: _____ _____ % Size:_____

4. Describe the textures of the minerals in the rock:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

(You need to describe the shape of the minerals, the minerals they are associated with, and any other special textures)

5. Describe the paragenetic sequence identified in the thin section, and justify your answer with textural observations

_____
_____
_____
_____
_____
_____
_____
_____
_____

Section 2

1. What is the section name? _____
2. **How much glass is present in the section? _____ %**
3. What other minerals can be identified, and what is the average size of each crystal?

   Mineral 1: _____ _____ % Size:_____
   Mineral 2: _____ _____ % Size:_____
   Mineral 3: _____ _____ % Size:_____
   Mineral 4: _____ _____ % Size:_____
   Mineral 5: _____ _____ % Size:_____

4. Describe the textures of the minerals in the rock:

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

(You need to describe the shape of the minerals, the minerals they are associated with, and any other special textures)

5. Describe the paragenetic sequence identified in the thin section, and justify your answer with textural observations

_____
_____
_____
_____
_____
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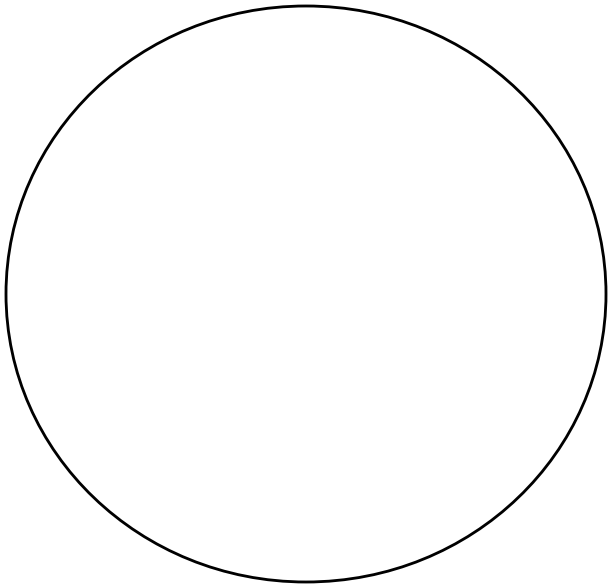
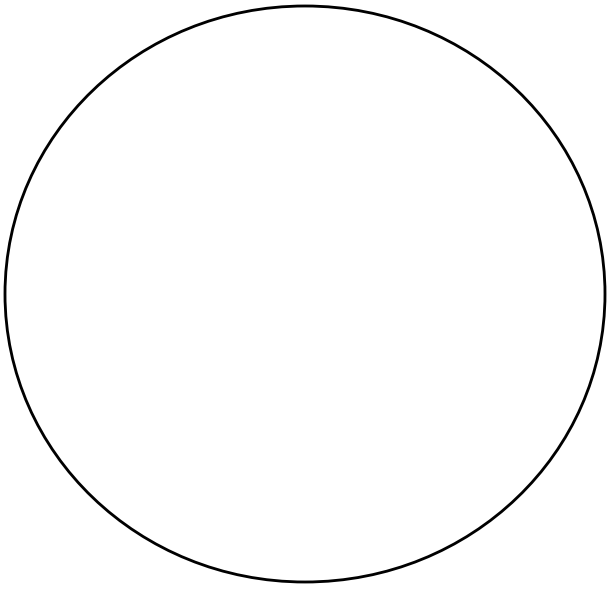
Section 1 Sketch



Section 2 Sketch



Part 2: Partial melting calculations

We have two magmas formed from the same source rock (M1 and M2). Using the partial melting equation ($C_l/C_o = 1/(D(1-F)+F)$), answer the following questions:

1. The source rock is comprised of 40 % olivine and 60% clinopyroxene. What are the bulk D values for the following elements?

Element	D for Olivine	D for Clinopyroxene	Bulk D
Sr	0.1	0.1	
Rb	0.01	0.05	

2. If the olivine in the source rock has a Sr concentration of 40 ppm and the clinopyroxene has a Sr concentration of 5 ppm, what is the overall concentration of Sr in the rock? _____
3. If the olivine in the source rock has a Rb concentration of 10 ppm and the clinopyroxene has a Rb concentration of 150 ppm, what is the overall concentration of Rb in the rock? _____
4. The rock melts by 5% (F=0.05). This magma is taken out as magma M1. What will be the C_l/C_o ratio in this melt? For Sr:_____ For Rb:_____
5. What will be the concentration of Sr in M1? _____
6. What will be the concentration of Rb in M1?_____
7. The rock melts by 25% (F=0.25). This magma is taken out as magma M2. What will be the C_l/C_o ratio in this melt? For Sr:_____ For Rb:_____
8. What will be the concentration of Sr in M2? _____
9. What will be the concentration of Rb in M2?_____
10. If a mixture of 20% M1 and 80% M2 is formed before the magmas start crystallising, what will the concentration of Sr be in the hybrid magma? _____
11. I have a glassy volcanic rock on surface. It has a Sr concentration of 450 ppm. Can this rock be related to magmas M1 or M2? If so, how?

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