UNIVERSITY OF PRETORIA

GLY 251 – CRYSTAL CHEMISTRY AND OPTICS

1. Semester test

Answer all the questions and use sketches where applicable. Don't waffle!!
Do not contradict yourself !

Theory

1. Discuss the difference in the requirements for the unit cell of mineral X (take your pick) for the case that it is euhedral or anhedral **[5]**

2. Argue from a symmetry point of view why there is no Bravais type in the cubic system with a face centered position only in [100] **[5]**

3. A crystal plane cuts a: 1 step, b: 2 steps, c: 1 step, while another plane cuts at a: 7 steps, b: 2 steps, c:1 step. What are the Miller indices, and which of the 2 planes would you expect for which reasons, on the outside of a crystal? **[10]**

4. In generic terms: what would you ask for to be able to calculate the density of a mineral? **[5]**

5. In simple words: will any cation fit into any gap in the anion framework of a mineral? **[5]**

6. A "friend" of mine claims that he can make complete solid solutions with any combination of cations. He thinks all he needs to do is to increase the temperature high enough. What do you think about this and what are your arguments? **[10]**

7. There seems to be like a substitution or whatever that sounds like a vacation substitution, you know? Do you? **[10]**

omission

Practical

MOLECULAR WEIGHTS	
SiO2	60.08
TiO2	79.88
Al2O3	101.96
Cr2O3	151.99
V2O3	149.88
Fe2O3	159.69
FeO	71.85