GLY 4310 Name_____
Homework Exercise 1 - Key

Review of Silicate Minerals

The following homework is based on the Silicate Mineral lecture, as well as information from the textbook, Chapters 18 and 19. The PowerPoint version is available on the web pages.

1. What silicate subclass do the following minerals belong to? (1 point each)

	Mineral	**Silicate Subclass**
0	A. Aegirine	Inosilicate
0	B. Biotite	Phyllosilcate
0	C. Epidote	Solosilicate
0	D. Fayalite	Nesosilicate
0	E. Grossularite	Nesosilcate
0	F. Hornblende	Inosilicate
0	G. Kyanite	Nesosilicate
0	H. Labradorite	Tectosilicate
0	I. Orthoclase	Tectosilicate
0	J. Tourmaline	Cyclosilicate

2. Indicate if each of the following minerals is hydrous or anhydrous? (1 point each)

0	A. Actinolite	Hydrous
1	B. Augite	Anhydrous
0	C. Kaolinite	Hydrous
1	D. Oligoclase	Anhydrous
1	E. Nepheline	Anhydrous

3. Match the mineral species with the group of which it is a member. Answers may be used once, more than once, or not at all. (1 point each)

	Mineral Species	Group
0	G 1. Albite	A. Al_2SiO_5
0	E 2. Almandine	B. Amphibole
0	B 3. Anthophyllite	C. Clay
0	G 4. Bytownite	D. Feldspathoid
0	L 5. Cristobalite	E.Garnet
0	I 6. Diopside	F. Mica
0	I 7. Enstatite	G. Plagioclase Felspar
2	K 8. Kirschsteinite	H. Potassium Feldspar
0	D 9. Nepheline	I. Pyroxene
0	F 10. Phlogopite	J. Pyroxenoid
0	B 11. Riebeckite	K. Olivine
0	H 12. Sanidine	L. Silica
0	A 13. Sillimaniute	M. Zeolite
0	C 14. Smectite	
0	M 15. Stilbite	
0	L 16. Stishovite	
0	J 17. Wollastonite	

13 4. In both the Inosilicate groups Amphibole and Pyroxene, both orthorhombic and monoclinic structures exist. Explain what causes the difference in structure. (It is the same cause in both groups). 4 points

Pyroxenes have two distinct divalent cation sites, M1 and M2. Amphiboles have four sites, M1 through M4. If the sites are all filled with cations which Goldschmidt's rules tell us can freely substitute for each other, little or no ordering of cations on any particular site will occur. This is usually Mg^{2+} and Fe^{2+}. This produces an orthorhombic structure. If one cation is considerably larger, such as Ca^{2+}, it will preferentially occupy the largest available site, producing order, and lowering the symmetry to monoclinic.

5. Indicate whether each of the following species is an amphibole or a pyroxene, and whether it is orthorhombic or monoclinic.

	Mineral Species	**Group**	**Symmetry**
0,0	Ferrosilite	Pyroxene	Ortho
0,0	Grunerite	Amphibole	Clino
0,0	Hedenbergite	Pyroxene	Clino
0,0	Tremolite	Amphibole	Clino