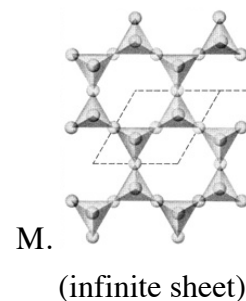
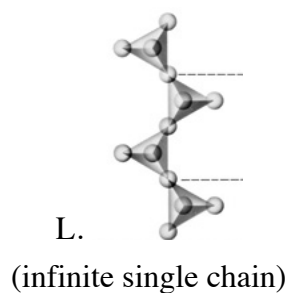
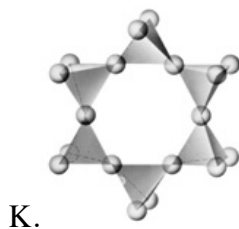
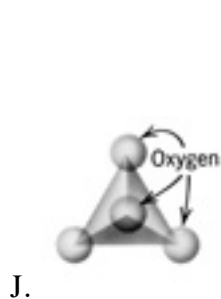


1. Matching (more than one answer may be applicable):

[20 pts]

_____	nesosilicate	A. $[\text{Si}_2\text{O}_7]^{6-}$
_____	garnet group	B. biotite
_____	phyllosilicate	C. $[\text{Si}_2\text{O}_6]^{4-}$
_____	double chain inosilicate	D. $[\text{Si}_4\text{O}_{11}]^{6-}$
_____	kyanite	E. $[\text{Si}_6\text{O}_{18}]^{12-}$
_____	tectosilicate	F. $[\text{SiO}_2]^\circ$
_____	sorosilicate	G. zircon
_____	single chain inosilicate	H. epidote
_____	beryl	I. olivine
_____	cyclosilicate	



N. diopside

O. Al_2SiO_5

P. grossular

Q. actinolite

2. Metamorphism of impure siliceous limestone can produce various mineral assemblages depending on circumstances. Write balanced reactions for the following situations: [15 pts]

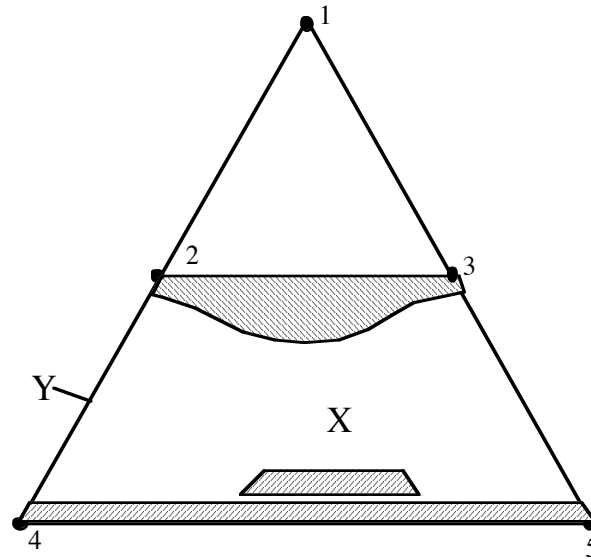
a. calcite + quartz + hematite \rightarrow andradite + fluid (CO_2)

b. calcite + quartz \rightarrow wollastonite + fluid

c. dolomite + quartz + H_2O \rightarrow tremolite + calcite + fluid

3. On the diagram at the places with numbers, write in the NAME, the FORMULA and the SHORTHAND SYMBOL for each number on the diagram. What minerals coexist at: [19 pts]

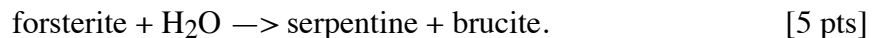
X _____, Y _____.



4. Phyllosilicates



a. As a group, the swelling clay minerals are known as _____. [5 pts]

b. A serpentinite is a rock composed essentially of serpentine, often derived by alteration of olivine. Write a balanced reaction representing:



c. Discuss the structural reasons why one form of serpentine, chrysotile asbestos, crystallizes in a fibrous habit. [10 pts]

d. Supply the missing trioctahedral phyllosilicate name or formula, and a schematic drawing

below, using the conventions we discussed in class:  = octahedral layer, and  = tetrahedral layer. [8 pts]

brucite

Mg(OH)₂



Mg₆Si₄O₁₀(OH)₈

talc

phlogopite

Mg₃Si₄O₁₀(OH)₂-Mg₃(OH)₆

5. YOUR CHOICE:

- What is the general formula for garnet? List the compositions of the members of the pyrospite and ugrandite groups, OR,
- What are the polymorphs of sillimanite (names and formulae), and draw a generalized P-T diagram showing their fields of stability. [18 pts]

Extra credit: A pink single chain inosilicate (name, formula)

[2 pts xc]