GLY 4200 Name_____
Homework Exercise 7

BINARY PHASE DIAGRAMS - PERITECTIC BEHAVIOR

1. Examine figure 1 on the attached sheet. On the attached diagram, outline each liquidus line in green, each solidus line in brown.

a. What is the minimum number of components necessary to describe all of the phases shown? _____

b. How many phases are present in the region labeled Fo + En?

_____

c. How many phases are present in the region labeled Qtz + Liq?

_____

d. How many phases are there in the region labeled Fo + Liq?

_____

e. How does the number of degrees of freedom change on going from En + Liq to En + Quartz? _____

f. How does the number of degrees of freedom change on going from Fo + Liq to En + Liq?

_____

g. List the phases present at the peritectic point.

_____

h. How many degrees of freedom does the sample have at the peritectic point?

_____

i. List the phases present at the eutectic point.

_____

j. How many degrees of freedom does the sample have at the eutectic point?

_____

k. How do your answers to g through j explain the observed cooling curve (figure 2) which could apply to either the peritectic or eutectic points?

_____

_____

_____

_____

2. Starting with a composition of 31% silica, trace the behavior of the melt from 1700°C to 1500°C. Show the path followed by the liquid in red, the path followed by the solid in blue.

a. At what temperature does the solid first appear? _____

b. What is the composition of the first solid? _____

c. At 1560°C, what phases are present? _____

d. What percent of each phase is present? _____

(HINT: See Lever Rule file)

e. At 1540°C, what percent of each phase is present? _____

f. What phases are present at 1480°C? _____

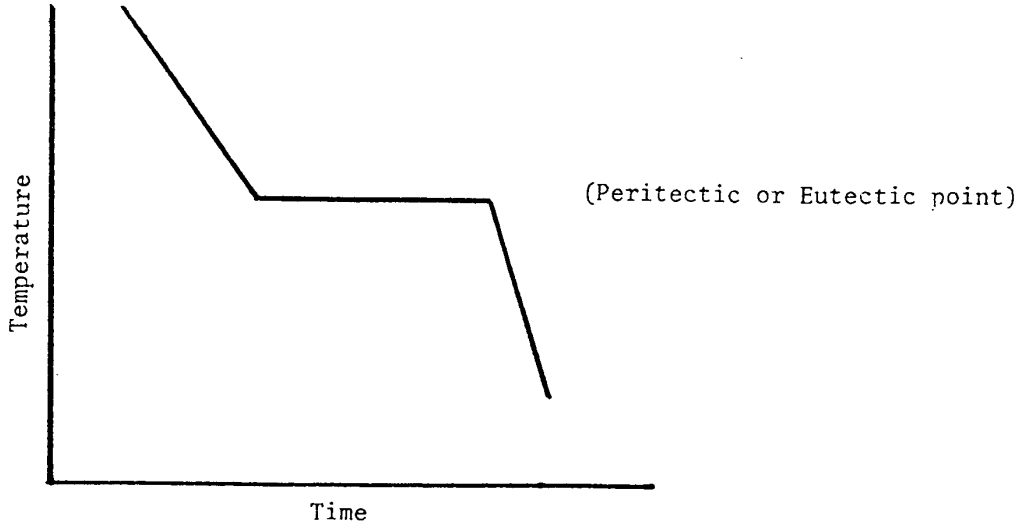
g. At 1480°C what is the percent of each phase present?

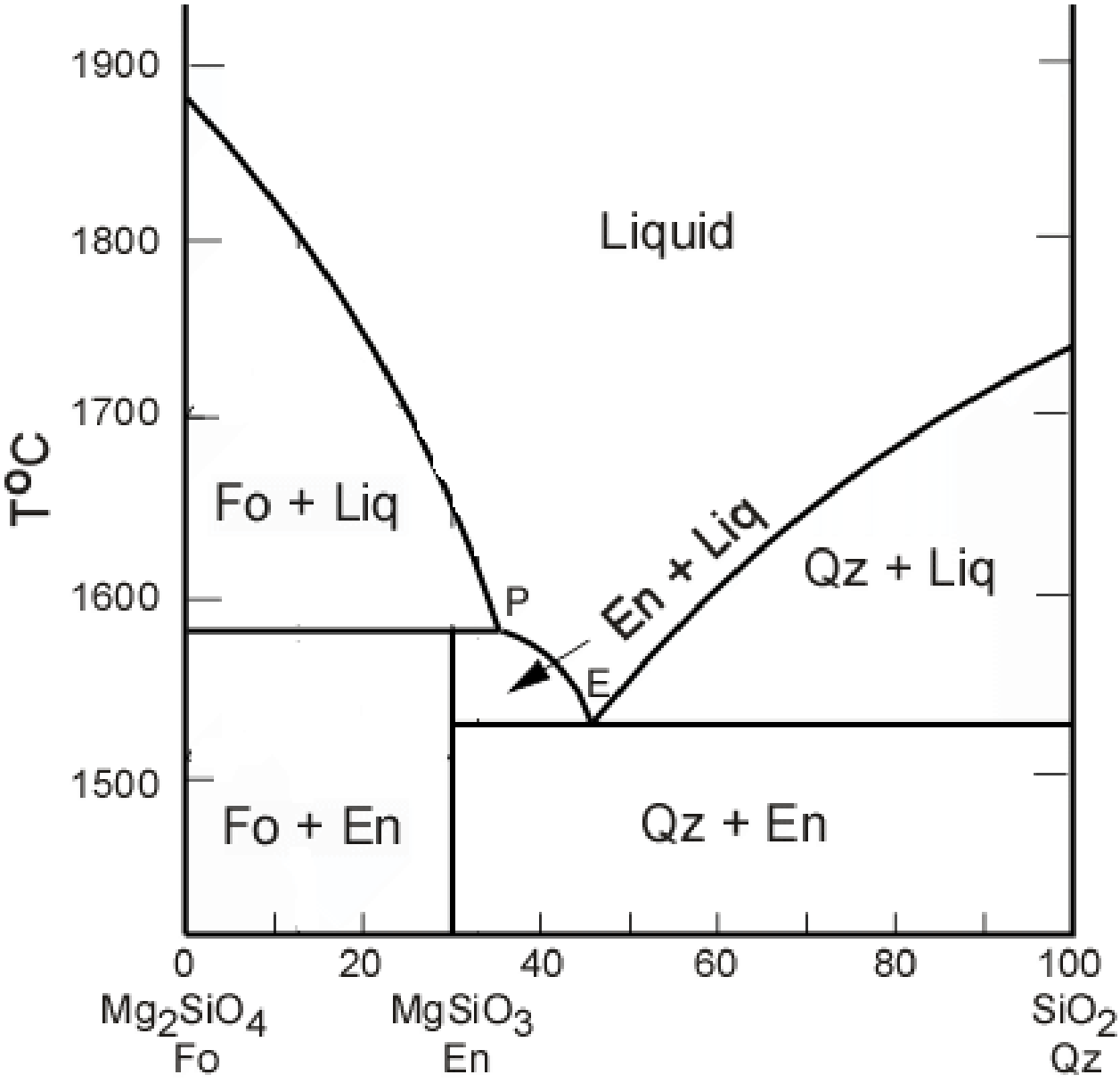
_____

h. What temperature does the last liquid disappear? _____

i. What is the composition of the last liquid? _____

FIGURE 2




1900
1800
1700
1600
1500
T°C
Liquid
Fo + Liq
En + Liq
Qz + Liq
P
E
Fo + En
Qz + En
0
20
40
60
80
100
Mg2SiO4
Fo
MgSiO3
En
SiO2
Qz