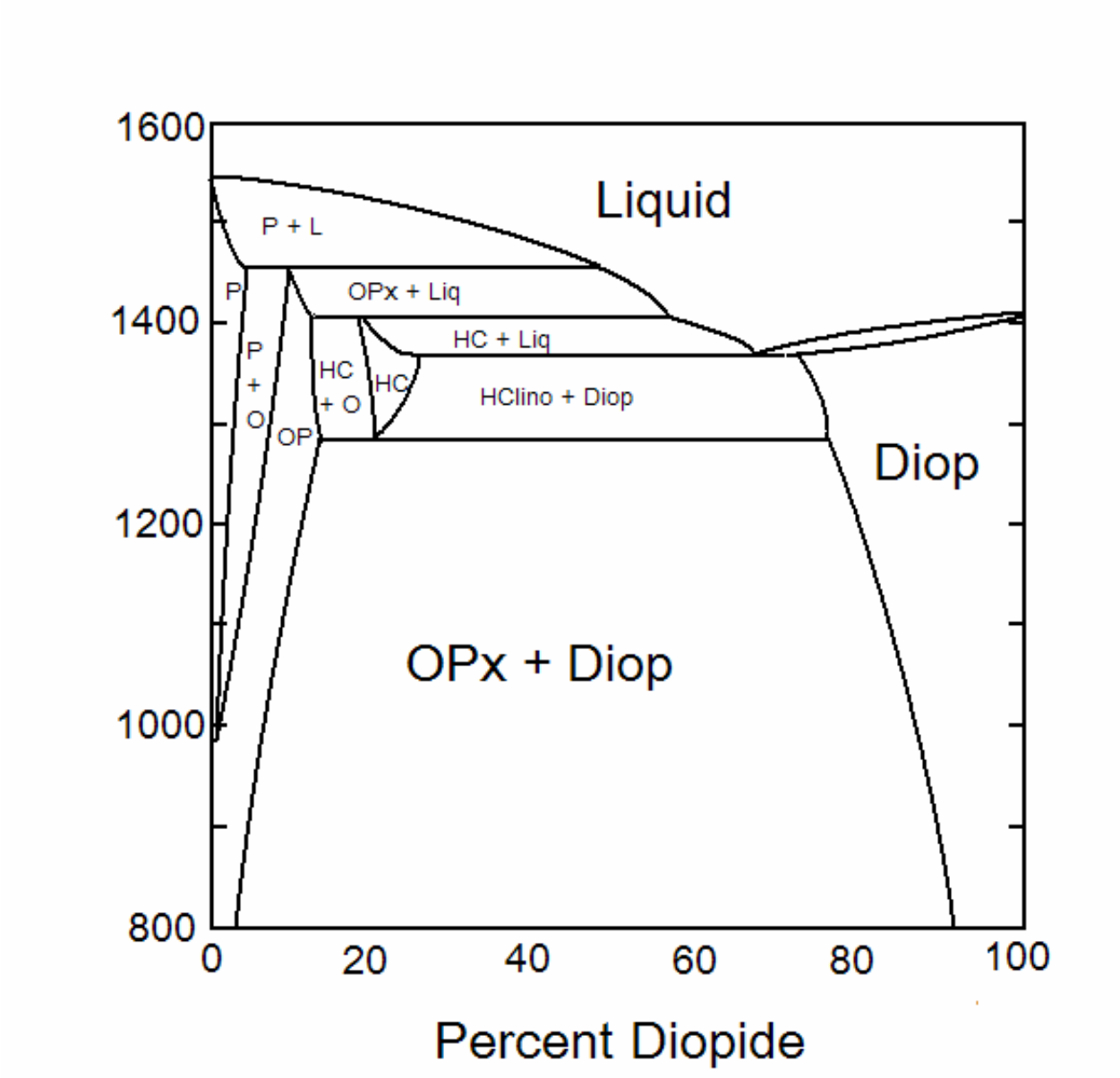

Above is a simplified temperature-composition phase diagram for the system enstatite ($Mg_2Si_2O_6$) - diopside ($CaMgSi_2O_6$), which are common constituents of peridotites, gabbros, and basalts. The phase abbreviations are:

P	Protoenstatite	*Pbcn*
O	Orthoenstatite	*Pbca*
HC	High clinoenstatite	*C*2/*c*
Di	Diopside	*C*2/*c*
L	Liquid	

Starting with a composition of 80% enstatite and 20% diopside ($En_{80}Di_{20}$), which is totally liquid at 1600ºC, follow it through a perfectly equilibrium crystallization and subsolidus reaction process using this diagram. This composition is closer to the left of the diagram.

1. At 1600ºC, how many phases are present? _____
2. On cooling from 1600ºC, at what temperature do the first crystals form?_____
3. What is the composition of the first crystals to form? _____
4. What is the space groups of the first crystals to form? _____
5. At what temperature do the first crystals of orthoenstatite form? _____
6. What is their composition? En _____Di_____
7. At what temperature do the last crystals of Protoenstatite disappear? _____
8. At what temperature do the first crystals of high clinoenstatite form? _____
9. At what temperature does the last liquid disappear? _____
10. At 1350ºC, how many phases are present? _____
11. At what temperature do the first crystals of diopside form? _____
12. What is the composition and space group of the phase or phases present at 1200ºC?

    _____

13. What is the composition and space group of the phase or phases present at 900ºC?

    _____