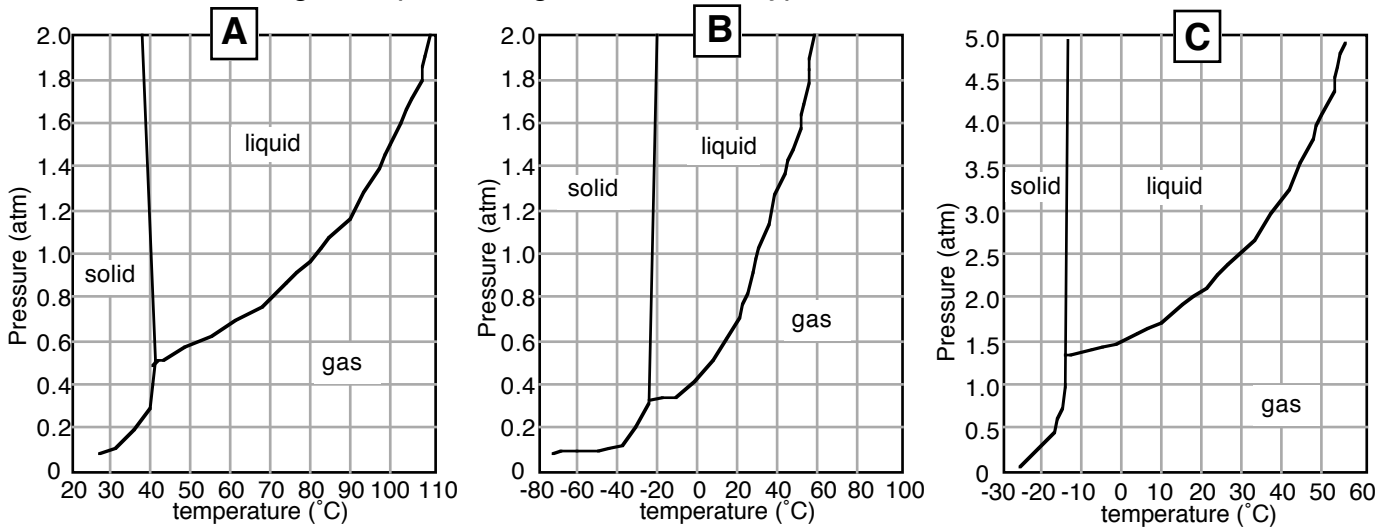
WS 6.7 Phase Diagrams

Consider the following three phase diagrams for three hypothetical substances: A, B, and C.



1. What is the stable state(s) (s,l, or g) for substance **A** at room conditions (1.0 atm & 25˚C)? _____

2. What is the stable state(s) for substance **B** at room conditions? _____ ...for substance **C**? _____

3. At 1.6 atm and 50˚C, what is/are the stable state(s) for **A**? ____ ...for **B**? _____ ...for **C**? _____

4. At 1.0 atm what are the melting point (**mp**) boiling point (**bp**) and sublimation point (**sp**) for each of the three substances? (use "**NA**" for not applicable)

A: mp=___ bp=___ sp=___ **B**: mp=___ bp=___ sp=___ **C**: mp=___ bp=___ sp=___

5. At 0.4 atm what are the melting point (**mp**) boiling point (**bp**) and sublimation point (**sp**) for each of the three substances? (use "**NA**" for not applicable)

A: mp=___ bp=___ sp=___ **B**: mp=___ bp=___ sp=___ **C**: mp=___ bp=___ sp=___

6. As pressure increases, what happens (↑ ,↓ , or ---) to the bp of **A**? ___ ...of **B**? ___ ...of **C**? ___

7. As pressure increases, what happens (↑ ,↓ , or ---) to the mp of **A**? ___ ...of **B**? ___ ...of **C**? ___

8. At 50˚C, what pressure is required to condense gaseous **A** into a liquid?____ **B**?____ **C**?___

9. What is the significance of the triple point of a substance? _____

10. What is the triple point (P & T) for **A**? ____ / ____ ... for **B**? ____ / ____ ...for **C**? ____ / ____

11. Some solid **A** is at 0.6 atm & 40˚C. What would happen (melt, boil, freeze???) if the pressure were increased? _____ ...if the pressure were decreased? _____

12. Some liquid **B** is at 0.4 atm & -20˚C. What would happen (melt, boil, freeze???) if the pressure were increased? _____ ...if the pressure were decreased? _____

13. When you heat up a sample of iodine at room conditions, it changes directly from a solid to a gas. What does this imply about iodine's triple point pressure? _____ temp? _____

14. When a sample of methane gas is cooled, it condenses to a liquid and then freezes to a solid. What does this imply about methane's triple point pressure? _____ temp? _____

15. How is a phase diagram like a map? _____

Ans- IRO: s l l l/g g g -25 -25 -21 -17 -14 -14 -4 0 0.3 0.5 0.6 1.3 1.5 4.1 30 40 41 41 81 NA NA NA NA NA NA NA NA NA melt sublime freeze boil ↑↑↑↑↓—