

CHE 120 Ungraded Assessment 4 (content for Quiz 4)

Name: _____

1. (4 pts) Consider the phase diagram at right.

a) Label the phases in each region.

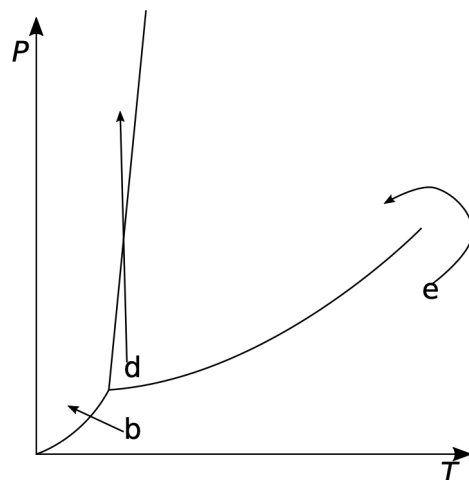
For arrows **b**, **d**, **e**, what phase transition, if any, occurs (use the correct name)?

b) _____ d) _____ e) _____

f) Label the triple point with a **T** and critical point with a **C**.

g) Is the solid or liquid state denser? _____

h) The triple point pressure is 1.02 atm. At 1 atm, the solid is heated from 0 K to a very high temperature. What phase transitions, if any, occur?



2. (4 pts) a) Consider the species OF and OF⁻. For each, draw an MO diagram *or* write out the electron configuration.

b). Fill out the following table. The two species have measured bond lengths of 135 pm and 152 pm and bond energies of 234 kJ/mol and 413 kJ/mol. Assign each number to the appropriate species.

Species	Bond Order	Para or diamagnetic?	Bond length (pm)	Bond Energy (kJ/mol)
OF				
OF ⁻				

3. (1 pt) Remember the four types of solids: Covalent Network, molecular, ionic, and metallic.

What type of solid is Na₂CO₃ _____ Ca _____ NH₃ _____

Si (adopts the diamond crystal structure) _____

4. (6 pts) Fill out the table below.

Substance	What forces?	Substance	What forces?
a) CH ₃ CH ₂ CH ₃		b) CH ₃ OH	
c) Which has the higher boiling point? (Why? Which is IMF most responsible?)			

d) $\text{CH}_3(\text{CH}_2)_{20}\text{CH}_3$ (20 CH_2 groups in the middle)	e) $\text{CH}_3\text{CH}_2\text{NH}_2$
f) Which has the higher boiling point? (Why? Which IMF is most responsible?)	
g) CO_2	h) H_2S
i) Which has the higher boiling point? (Why? Which is IMF most responsible?)	

5. (5 pts) Determine the rate law, overall order, and rate constant for the reaction $2\text{A}(\text{aq}) + \text{B}(\text{aq}) \rightarrow \text{C}(\text{aq}) + \text{D}(\text{aq})$.

[A] (M)	[B] (M)	Initial Rate (M/s)
0.10	0.010	1.8×10^{-4}
0.20	0.020	3.6×10^{-4}
0.20	0.010	1.8×10^{-4}
0.20	0.040	7.2×10^{-4}

Rate =

Overall order = _____

Rate constant = _____