

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.

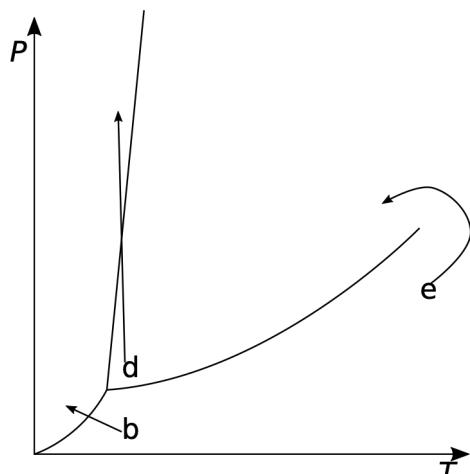
For arrows b, d, e, what phase transition, if any, occurs (use the correct name)?

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 Na_2CO_3 _____ Ca _____ NH_3 _____

Si (adopts the diamond crystal structure) _____

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

Substance	What forces?	Substance	What forces?
a) $\text{CH}_3\text{CH}_2\text{CH}_3$		b) CH_3OH	
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 CH₂ 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 = _____