Chemistry 141 Name

Cary Willard

Quiz 9a (20 points) November 19, 2009

All work must be show to receive credit. Remember, significant figures are important!

$ln\frac{P\_{2}}{P\_{1}}=\frac{-∆H\_{vap}}{R}\left(\frac{T\_{1}-T\_{2}}{T\_{1}T\_{2}}\right)$, R=0.0821 L atm/mol K = 8.314 J/mol K

1. (12 points) Ethanol has a heat of vaporization of 38.56 kJ/mol and a normal boiling point of 78.4oC.
	1. What is the vapor pressure of ethanol at 25.0oC?
	2. What is the boiling temperature of ethanol on Pikes Peak, where the atmospheric pressure is 540 torr?
2. (8 points) A newly formulated substance has a normal boiling point of 314oC, a normal freezing point of 16oC, a triple point at 460 torr and 29oC, and a critical point at 7302 torr and 603oC. Draw a phase diagram for this substance, labeling the liquid, gas, and solid phases, the triple point, the critical point, and the supercritical fluid.

Which is more dense for this substance, the liquid or the solid state? Explain how you arrived at this answer.

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$ln\frac{P\_{2}}{P\_{1}}=\frac{-∆H\_{vap}}{R}\left(\frac{T\_{1}-T\_{2}}{T\_{1}T\_{2}}\right)$, R=0.0821 L atm/mol K = 8.314 J/mol K

1. (12 points) Ethanol has a heat of vaporization of 38.56 kJ/mol and a normal boiling point of 78.4oC.
	1. What is the vapor pressure of ethanol at 35.0oC?
	2. What is the boiling temperature of ethanol under the ocean, where the atmospheric pressure is 1577 torr?
2. (8 points) A newly formulated substance has a normal boiling point of 531oC, a normal freezing point of 68oC, a triple point at 260 torr and 53oC, and a critical point at 8674 torr and 815oC. Draw a phase diagram for this substance, labeling the liquid, gas, and solid phases, the triple point, the critical point, and the supercritical fluid.

Which is more dense for this substance, the liquid or the solid state? Explain how you arrived at this answer.