**Quiz 10**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

1. For each pair of solids, determine which solid has the higher melting point and explain why (6 points).
	1. Ne (s) and Xe (s)

Xe (s); xenon has a higher molar mass and thus more London dispersion forces.

* 1. NaCl (s) and CH4 (s)

NaCl (s); NaCl (s) is an ionic solid, and CH4 (s) is a molecular solid.

* 1. H2O (s) and H2S (s)

H2O (s); while both are molecular solids, water has strong hydrogen bonding.

1. What is the length of an edge of the unit cell when barium (atomic radius 222 pm) crystallizes in a crystal lattice of bcc unit cells (3 points)?

$$l=\frac{4}{\sqrt{3}}r=\frac{4}{\sqrt{3}}\left(222 pm\right)=513 pm$$

1. Crystals of both LiCl and KCl have the rock salt structure. In the unit cell of LiCl, adjacent Cl- ions touch each other. In KCl, they don’t. Why (2 points)?

K+ is much larger than Li+ and so does not fit well into the octahedral holes of the fcc lattice.

1. A solution contains 3.5 moles of water and 1.5 moles of nonvolatile glucose (C6H12O6). What is the mole fraction of water in this solution (3 points)?

$$χ\_{H\_{2}O}=\frac{n\_{H\_{2}O}}{n\_{total}}=\frac{3.5 mol}{3.5 mol+1.5 mol}=\frac{3.5 mol}{5.0 mol}=0.72$$

1. Calculate the molality of 71.5 mmol of acetic acid in 125 g of water (5 points).

$$m=\frac{n\_{solute}}{kg\_{solvent}}=\frac{71.5 mmol HC\_{2}H\_{3}O\_{2}}{125 g}×\frac{1 mol}{1000 mmol}×\frac{1000 g}{1 kg}=0.572 m HC\_{2}H\_{3}O\_{2} $$

1. Is today’s experiment qualitative or quantitative (1 point)? \_\_\_\_\_qualitative\_\_\_\_\_\_\_\_\_\_\_