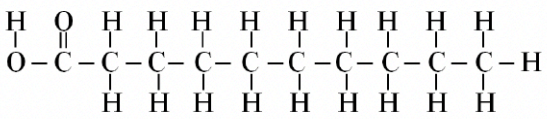
Name: _____ Date: _____

Unit 3.2

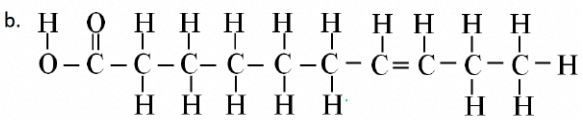
Intermolecular Forces & Properties

1. Which of the following structures is most likely to be a solid at room temperature? Justify your answer in terms of intermolecular interactions?

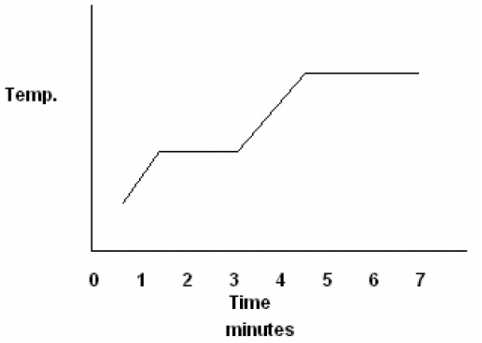
a.



b.



2. The following graph shows the plot of temperature versus time as heat is added to a pure substance.



(a) During what period of time was the substance at its normal freezing point?

(b) Over what period of time was the substance boiling?

(c) What is happening to the substance between the 1 and 1.5 minute marks?

(d) What is happening to the substance between the 2 and 3 minute marks?

(e) What is happening to the substance between the 3.5 and 4.5 minute marks?

(f) What is happening to the substance between 5 and 7 minute marks?

3. Explain why the standard enthalpy of vaporization, ΔH_{vap}, values for each set of compounds below are not the same.
   1. CH_4 and H_2O

   2. PH_3 and NH_3

   3. C_2H_6 and C_3H_8

4. Explain why the boiling point of water decreases as elevation increases.

5. At -92˚C, a pure sample of HBr has a higher vapor pressure than a pure sample of KBr.
   (a) Explain why the vapor pressure of HBr is higher than the vapor pressure of KBr at -92˚C.

6. What are the main factors that account for the extreme hardness of diamond?

7. Which substance in each set has the highest melting point? Justify your answer using chemical principles.
   1. KCl or SiO_2

   2. NH_3 or $C_{diamond}$