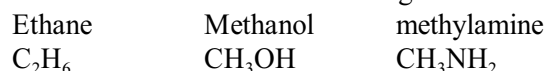


Lab Activity: Polarity of Molecules

1. Determine the Lewis structures for the following molecules



2. Using your Lewis structures construct a table to include the following headers:

- a) molar mass (b) number of valence electrons (c) bonding electron pairs, and
(d) lone pairs of electrons

3. Considering that the molar mass gives some indication of the relative size of molecules, are these three molecules approximately the same size.

On the basis of molecular size alone, would you expect the boiling points of these compounds to be similar or different? Explain.

4. Recall that the number of electrons gives some indication of the strength of the London's Forces in these molecules, would you expect the boiling points of these compounds to be similar or different? Explain.

5. Make models with the model kits provided, (or using toothpicks, styrofoam spheres, and marshmallows; the styrofoam for the central atoms and the marshmallows for the hydrogen atoms), of these molecules using the Lewis structures drawn above, and using VSEPR and bond angles from class notes.

6. Using your Data Book, determine the electronegativity values for the following:

carbon: _____ Hydrogen: _____ Nitrogen: _____ Oxygen: _____

7. Make a sketch of your models, showing all relevant details such as dipole arrows, partial charges, bond polarity, bond angles.

8. Using your models, predict which molecules are polar and which are non-polar. Justify your answer.

9. Which one of the three models is the most polar. Explain. Based on polarity, list the three compounds in order of increasing boiling point.

10. The boiling points of the three chemicals are given below:

Chemical	Boiling Point ($^{\circ}C$)
Ethane	- 88.6
Methylamine	- 6.3
Methanol	65.5

Explain the boiling points given in the above table.

11. Propanone, CH_3COCH_3 , propan-1-ol, $CH_3CH_2CH_2OH$, and butane, $CH_3CH_2CH_2CH_3$, have very similar relative molecular masses. List them in the expected order of increasing boiling point. Explain your answer.

12. Propane, $CH_3CH_2CH_3$, (bp = $-42.2^{\circ}C$), ethanol, CH_3CH_2OH , (bp = $78.5^{\circ}C$), and methanoic acid, $HCOOH$, (bp = $101.0^{\circ}C$), state the main type of IMFA present in these three molecules, and explain their boiling points.