**Skill 25.01 Problem 1**

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| Arrange the following molecules from low to high with respect to dipole moment  HF, HCl, HI, N2 |
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Ask: does the molecule have a central atom

no

Ask: are atoms the same? (yes or no)

yes

no

nonpolar

polar

Ask: are all the atoms bonded to the central atom the same (yes or no)

yes

no

Polar

Ask: are there any lone pairs on the central atom? (yes or no)

yes

yes

no

nonpolar

Polar

(Exceptions include: square planar and linear molecules, these are actually nonpolar)

**Skill 25.02 Problem 1**

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| Draw the Lewis structures for the following molecules, then using the flow chart above, determine whether or not each molecule is polar or nonpolar | |
| 1. SO2 | 1. ClF3 |
| 1. CH2F2 | 1. I3- |

Ask: is the molecule polar or nonpolar

polar

nonpolar

London dispersion

Ask: is there hydrogen attached to oxygen, nitrogen, or fluorine? (yes or no)

yes

no

Hydrogen bonding

Dipole-dipole

**Skill 25.03 Problem 1**

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| Draw the Lewis structures for the following molecules, then using the flow charts above, determine whether or not each molecule is polar or nonpolar along with the types of intermolecular forces of attraction it would be expected to experience.  (a) BF3  (b) CH3COCH3  (c) CH3OH  (d) XeF2 | |
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**Skill 25.04 Problem 1**

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| The structures and normal boiling points of dimethyl ether and ethanol are given in the table below.    Which of the following diagrams best helps to explain the difference in boiling point of the two compounds? Justify your reasoning. |
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**Skill 25.04 Problem 2**

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| Arrange the following from low to high with respect to boiling point:  CO2, N2, H2, O2, I2 |
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**Skill 25.04 Problem 3**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rank the following compounds from low to high with respect to boiling point.  Justify your reasoning.   |  |  | | --- | --- | | Compound | Formula | | Propane | CH3CH2CH3 | | Propanone | CH3COCH3 | | 1-propanol | CH3CH2CH2OH | |
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**Skill 25.04 Problem 4**

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| If the pressure of each gas is increased at constant temperature until condensation  occurs, which gas will condense at the lowest pressure? In each case, justify your answer. |
| (A) Methane (CH4)  (B) Ethane (CH3CH3)  (C) Butane (CH3CH2CH2CH3)  (D) All the gases will condense at the same pressure. |
|  |
|  |