

AGGREGATE HOMEWORK QUESTIONS

1. Using London forces and dipole-dipole forces of attraction, state the major type of intermolecular force present between molecules of the following substances.
 - a. Water
 - b. Carbon dioxide
 - c. Ethane
 - d. Ethanol
 - e. Ammonia
 - f. Iodine

2. Which of the following pure substances has a stronger intermolecular force than the other? Provide your reasoning.
 - a. Hydrogen chloride or hydrogen fluoride
 - b. Chloromethane or iodomethane
 - c. Nitrogen tribromide or ammonia
 - d. Water or hydrogen sulfide

3. Based solely on London force theory, which of the following pure substances has the stronger London forces? Provide your reasoning.
 - a. Methane or ethane
 - b. Oxygen or nitrogen
 - c. Sulphur dioxide or nitrogen dioxide
 - d. Methane or ammonia

4. Based upon dipole-dipole and London forces, predict which substance in the following pairs has the higher boiling point. Provide your reasoning.
 - a. Beryllium fluoride (BeF_2) or oxygen difluoride (OF_2)
 - b. Chloromethane (CH_3Cl) or ethane (C_2H_6)

5. For each of the following molecular compounds, hydrogen bonds contribute to the attraction between molecules. Draw the Lewis diagrams using a dashed line to represent a hydrogen bond between two molecules of the same substance.
 - a. Hydrogen peroxide (H_2O_2)
 - b. Hydrogen fluoride (HF)
 - c. Ethanol ($\text{C}_2\text{H}_5\text{OH}$)
 - d. Ammonia (NH_3)

6. All molecular compounds can have London, dipole-dipole and hydrogen bonding affecting their physical and chemical properties. Indicate which intermolecular forces contribute to the attraction between molecules in each of the following classes of organic compounds:
- Hydrocarbons
 - Alcohol
 - Ether
 - Carboxylic acid
 - Ester
 - Amine
 - Amide
 - Aldehyde
 - Ketone
7. For each of the following pairs of chemicals, which one is predicted to have the stronger intermolecular attraction? Provide your reasoning.
- Chlorine or bromine
 - Fluorine or hydrogen chloride
 - Methane or ammonia
 - Water or hydrogen sulphide
 - SiH_4 or CH_4
 - CH_3Cl or $\text{C}_2\text{H}_5\text{OH}$