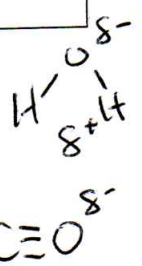
Intra vs. Inter molecular forces

Melting points

Melting points °C	
Diamond	4093
C_7H_{16}	-94
H_2O	0
CO	-205
NaCl	780

1. Of the following substances above,
   a. which is likely a network covalent? Diamond
   b. What is broken when this substance is melted? Covalent Bond

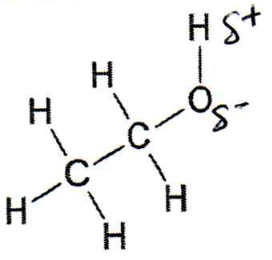
2. H_2O and CO contain the same intramolecular bond.
   a. What is the intramolecular bond? Covalent / Polar Covalent Bond
   b. What is broken when water is melted? IMF - Hydrogen Bond
   c. What is broken when CO is broken? IMF - Dipole Dipole



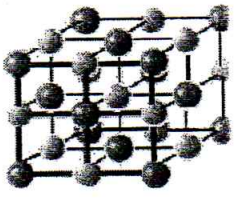
3. At -50°C, butane (C_4H_{10}) is likely to be a solid. Justify or nullify this statement.
   C_4H_{10} - is a solid due to LDF

4. When a sample of NaCl is being melted, what force is being broken? Ionic Bond
   a. What are the factors that affect the strength of an ionic compound? → Ionic charges → size of atoms
   b. With what you know about the strength of ionic compounds, write out 3 different ionic compounds and list them in order of increasing melting points.
      $NaCl$ $MgCl_2$ $AlCl_3$

5. What is the fundamental difference between ionic and molecular (covalent) substances when melting? (What breaks?)
   ↳ Ionic Breaks ionic
   Molecular Breaks IMF



6. What type of substance is at the right (covalent, covalent network, ionic)
7. What are the factors affecting its melting points?
   ↳ IMF - Hydrogen Bonding



8. What type of substance is at the right (covalent, covalent network, ionic)
9. What are the factors affecting its melting points?
   Size of Charges / IND internuclear distance

10. List the following substances in increasing melting points.
    a. $CaCl_2$, NaCl, H_2O, $He_{(g)}$, C(diamond)
    b. AlP, $O_{2(g)}$, HF, H_2S, MgO

Lowest
He H_2O NaCl $CaCl_2$ Diamond
LDF HBond Ionic Network
O_2, HF, H_2S MgO AlP
(LDF) (HBond) Covalent Ionic → Increasing