SCCC Chemistry: Intermolecular Forces Practice Problems

1. Consider the following six choices below:
   A. ionic bond     D. dispersion (London) forces     G. metallic bond
   B. polar covalent bond     E. dipole-dipole forces     H. ion-dipole forces
   C. nonpolar covalent bond     F. hydrogen bond

Give the letter(s) for the type of bond or intermolecular force described for each of the following:

   i. What holds two I₂ molecules together in a sample of I₂(s)?
      - [D]

   ii. What holds atoms together in HF?
       - [B]

   iii. What holds atoms together in a hydrogen molecule?
       - [C]

   iv. What holds atoms together in AgCl?
       - [A]

   v. What holds two fluorine molecules together in a sample of liquid fluorine?
      - [D]

   vi. What holds two ammonia molecules together in a sample of liquid NH₃?
      - [D]

   vii. What bonds must be broken to boil water?
       - [C]

   viii. What bonds must be broken to melt Al₂O₃(s)?
       - [A]

   ix. Dry ice is CO₂(s). Because dry ice does not exist as a liquid under normal
       conditions, it sublimes when heated. What bonds are broken when dry ice sublimes?
       - [D]

2. Circle the all of the intermolecular forces that exist between molecules for the following samples:

   a. water: London forces dipole-dipole forces hydrogen bonds

   b. methane: London forces dipole-dipole forces hydrogen bonds

   c. CH₂O: London forces dipole-dipole forces hydrogen bonds

   d. SF₆: London forces dipole-dipole forces hydrogen bonds

   e. CH₂F₂: London forces dipole-dipole forces hydrogen bonds

3. Rank the following substances in terms of increasing boiling point: water, CH₂O, methane, CO₂

   - CH₄ < CO₂ < CH₂O < H₂O