

### IMFs Worksheet

**Q1.** Intermolecular forces are forces inside between molecule

Intramolecular forces are forces inside between molecule

**Q2.** Indicate the strongest IMF holding together thousands of molecules of the following. Then indicate what type of bonding is holding the atoms together in one molecule of the following.

NOTE\* - if the molecule is an ionic compound, then there is no IMF, the ions are all held together by ionic bonds.

S.No	molecule	IMF			BONDING		
		Dispersion forces	Dipole-Dipole	H-bonding	Ionic	Polar covalent	Non-polar covalent
1	$\text{NH}_3$						
2	$\text{CH}_4$						
3	$\text{NO}$						
4	$\text{O}_2$						
5	$\text{CCl}_4$						
6	$\text{NaCl}$						

**Q3.** Rank following molecule in increasing order of their strength .

$\text{H}_2\text{O}$ ,  $\text{CO}_2$ ,  $\text{HBr}$

**Q4. Which of the following molecule have high boiling point H<sub>2</sub> or HCl**

**Q5. Analyze the table below and answer the given questions**

Substance	Molar mass (g.mol <sup>-1</sup> )	Phase	Melting point (°C)	Boiling points (°C)
Helium	4	gas	-272	-269
Oxygen	32	gas	-218	-183
Petrol (C <sub>8</sub> H <sub>18</sub> )	114	liquid	-57	126
Candle wax (C <sub>23</sub> H <sub>48</sub> )	324	solid	63	380

a) Name is the substance which has strongest IMF

b) What are the key words you would use to explain the above?

Is polar

Is a non-polar

Has largest molecular mass

Strongest IMF

Weakest IMF

London dispersion forces

Dispersion – Dipole or Induced-dipole

Dipole-Dipole

More energy require to weaken IMF and change its phase

Less energy require to weaken IMF and change its phase