

Instructions

- ✓ Put a dash where necessary eg dipole-dipole, non-metal, induced-dipole
 - ✓ If a term is two words, only leave one space between the words
 - ✓ Round values off to 2 decimal places
-

Question 1

1.1 Intramolecular forces: Are forces inside between molecules
Intermolecular forces: Are forces inside between molecules

1.2 The types of Intramolecular forces are

1.3 covalent bonds occur between atoms of a _____ and a _____

1.4 The types of Van der Waals forces are

1.4 The other types of intermolecular forces are

1.5 The strongest IMF out of the above 6 is _____

1.6 The weakest IMF out of the above 6 is _____

1.7 State whether the following molecules contain lone pair/s on their terminal atom (central atom)

a)	CO ₂	Yes	No
b)	H ₂ O	Yes	No
c)	NH ₃	Yes	No
d)	BF ₃	Yes	No
e)	PCl ₃	Yes	No

1.8 Within compounds the greatest repulsion force always exists between:

Bonding pair – bonding pair

Lone pair – lone pair

Lone pair – bonding pair

1.9 State the shape of the following molecules

a) HF

b) H₂S

c) BCl₃

d) CCl₄

e) PF₅

Extension question:

For elements to have a full valence shell they need to obey the 'octet rule'.

Which states that each element must have 8 valence electrons to have a full shell.

There are obvious exceptions – like Hydrogen which only needs 2 electrons in its 1s level to have a full valence shell.

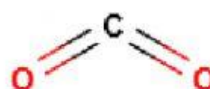
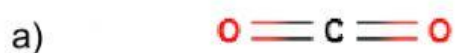
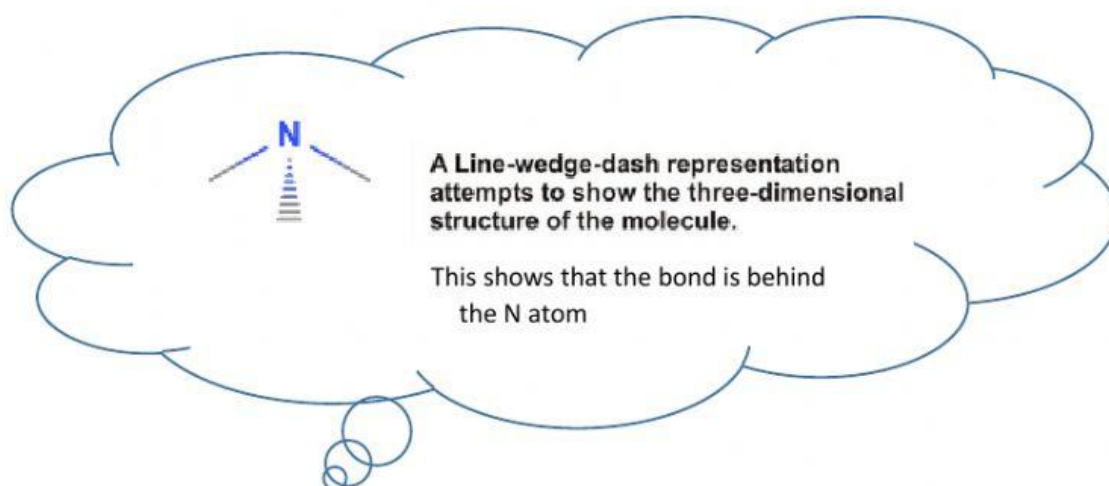
However- notice Phosphorus in PF₅. It will end up with 10 electrons!

This is as a result of (2 words) _____

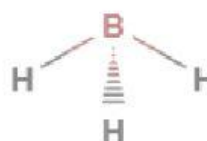
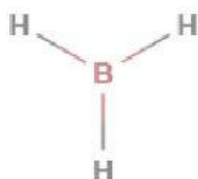
1.10 State whether the following molecules are polar or non-polar

- | | | | |
|----|------------------|-------|-----------|
| a) | CO ₂ | polar | non-polar |
| b) | H ₂ O | polar | non-polar |
| c) | CCl ₄ | polar | non-polar |
| d) | HBr | polar | non-polar |
| e) | NH ₃ | polar | non-polar |
| f) | BF ₃ | polar | non-polar |

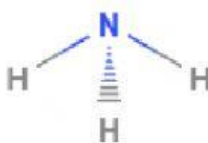
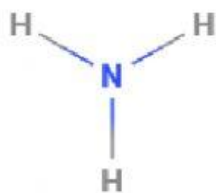
1.10 Choose the correct Couper structure for the given molecules:



b)



c)



Question 2

Consider the molecules He, Ne and Ar

2.1 Which of these would have the largest atomic radius and the largest molecular mass?

2.2 Which of these would thus have the:

2.2.1 highest melting point

2.2.2 highest viscosity:

2.2.3 highest vapour pressure

Question 3

Consider the following table of bond length

Bond	Bond length (pm)
C = C	134
C - C	154
Cl - Cl	199
I - I	266

- 3.1 As the bond length increases the bond energy will increase decrease
- 3.2 As the bond order increases the bond energy will increase decrease
- 3.3 Consider the $\text{C}\equiv\text{C}$ bond
How will the bond energy of $\text{C}\equiv\text{C}$ compare to that of $\text{C}=\text{C}$?
Greater than Less than Equal to

Question 4

State whether the following substance will be soluble or insoluble when mixed with each other.

- | | | | |
|-----|---------------------------------------|---------|-----------|
| 4.1 | CH ₄ in HCl | soluble | insoluble |
| 4.2 | HF in H ₂ O | soluble | insoluble |
| 4.3 | CH ₃ F in PCl ₅ | soluble | insoluble |