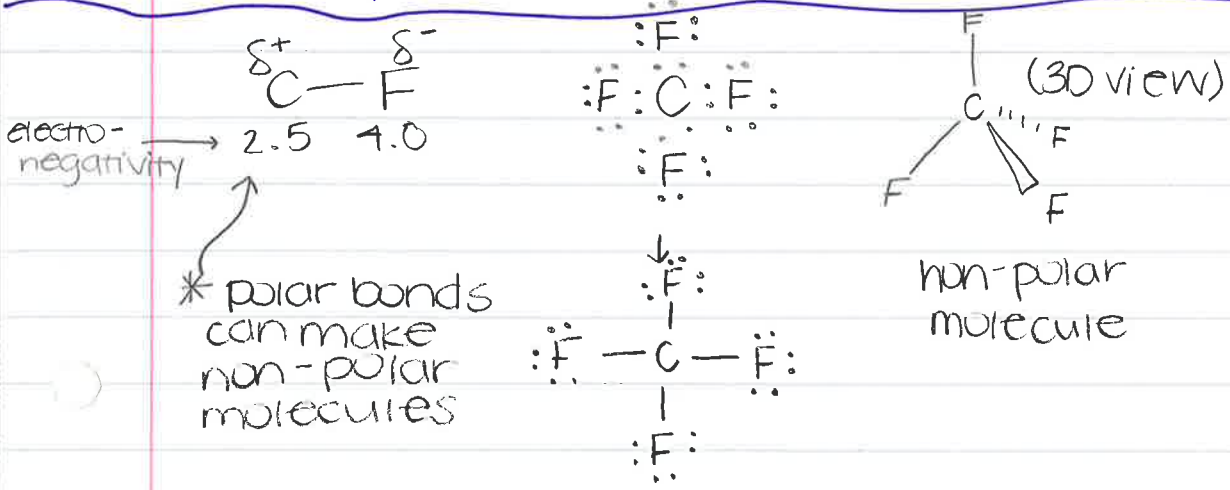
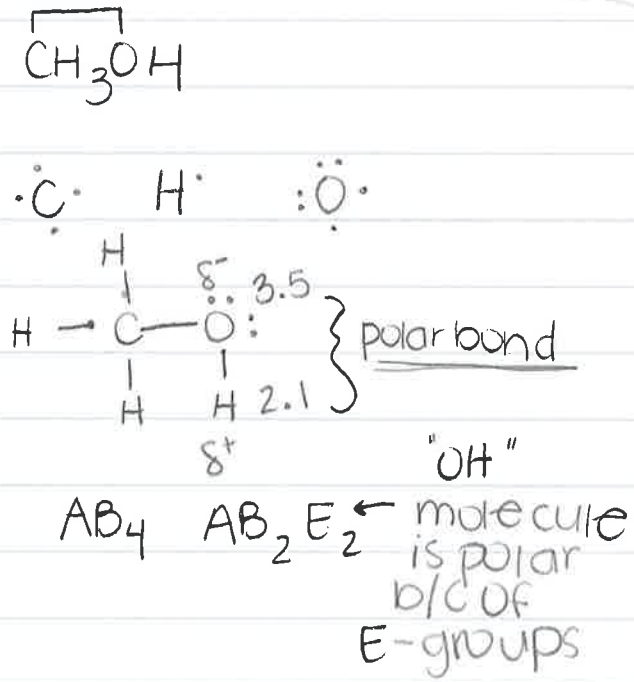
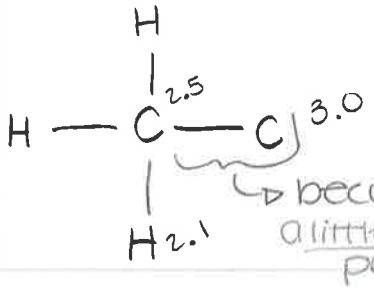
November 1st

* Today: Finish chaps 7 & 8
* This weekend: finish downloading logger pro from lab website
* Sunday: Problem club w/ Kendall (Eppley 211)
* Monday NOV. 4: start ch. 9
* Monday NOV. 11: CK4



C—H
2.5 2.1
functionally non-polar
< 0.5 difference in electronegativity, assume non-polar bond





becoming a little more polar

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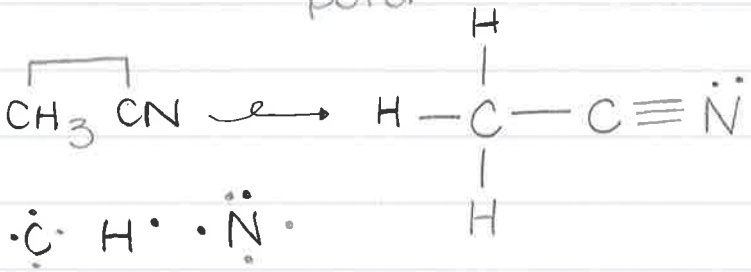
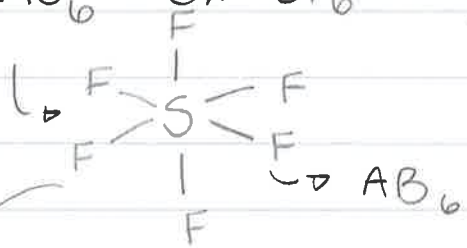


Six Groups:

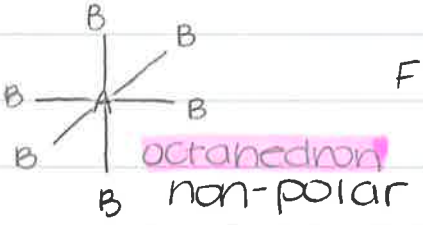
AB_6 → ex: SF_6



AB_6

(12 vale⁻)

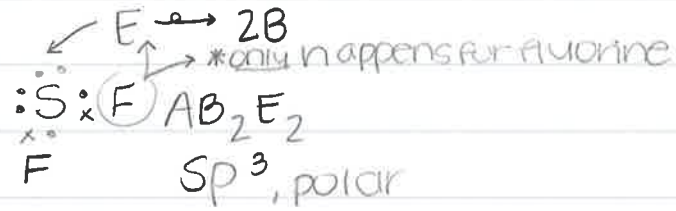
6 groups



octahedron

non-polar

ex: SF_6



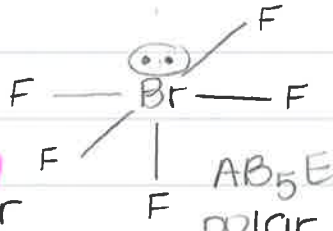
*only happens for fluorine

AB_2E_2

sp^3, polar

① lewis dot
② abe formula
③ shape

ex: BrF_5



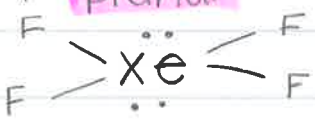
AB_5E → square pyramid

polar

↳ b/c has an E group

XeF_4

square planar

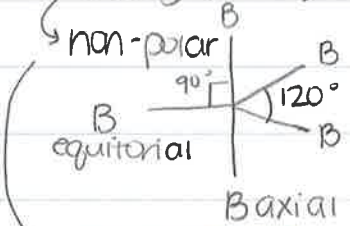


AB_4E_2

non-polar

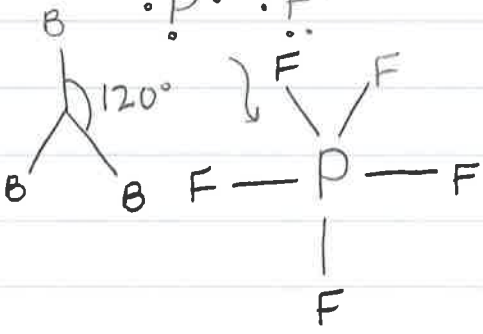
5 total groups

AB_5 (10 e⁻)



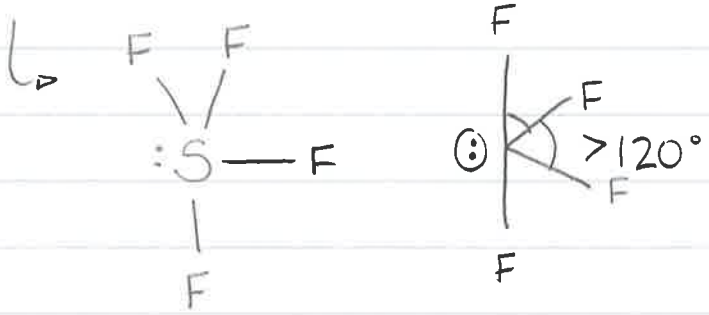
trigonal bipyramid

ex: PF_5

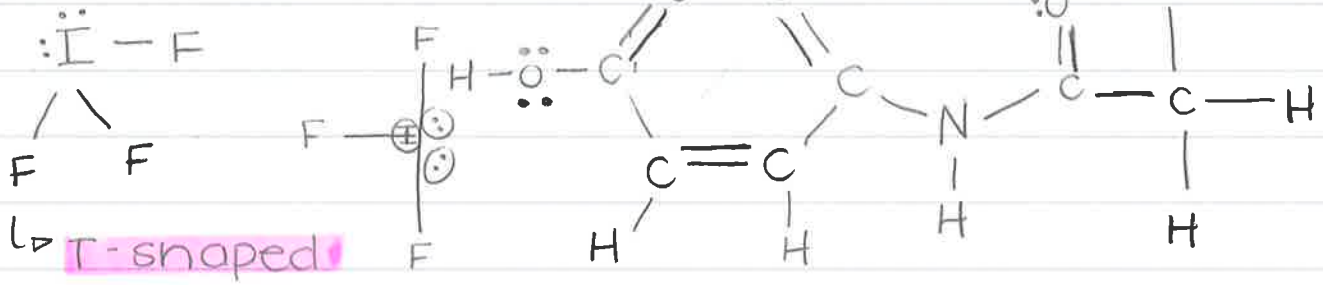


November 1st

AB_4E ex: SF_4
- see-saw
- polar

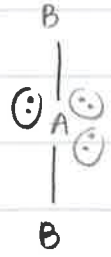


AB_3E_2 → ex: IF_3

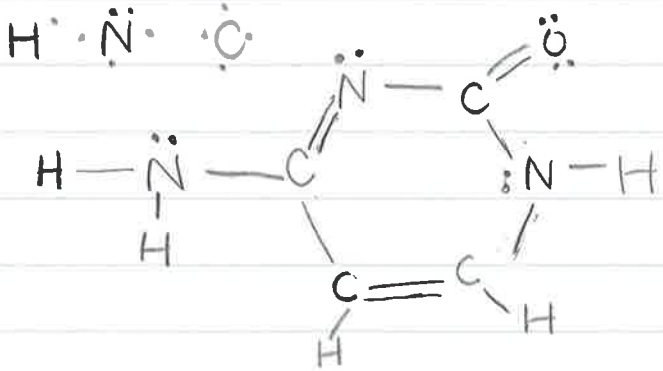


- T-shaped

AB_2E_3
- linear
- non-polar



↑ * problem like this on EXAM!!!



Ionic vs. Covalent

- lattice energies
  - 1000+ KJ/mol
  - * Ionics are ALWAYS solids
  - ex: $RbClO_4(s)$
- F — F
  - 159 KJ/mol
- C — H
  - 410 KJ/mol

LDF's (changing from e- → s)

much stronger ↑

* IF mass is greater than 300, always a solid

* room temp. = 298 K

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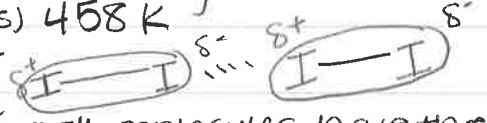
	bp
F_2	85 K
Cl_2	239 K
Br_2 (l)	332 K
I_2 (s)	458 K

LDF ∝ MM

* all → non-polar

→ London dispersion forces: "instantaneous dipoles"

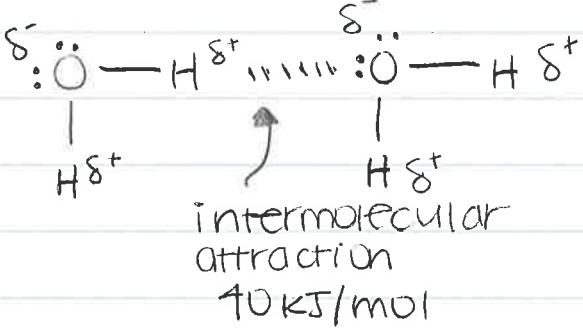


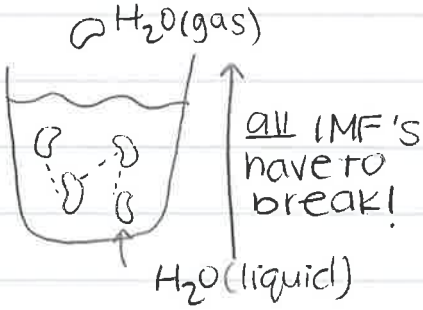
↳ * all molecules have them

↳ 1 - 10 KJ/mol

→ molecules can be solids, liquids or gases

→ covalent molecules ALL exhibit intermolecular forces (IMFs) that hold them to each other





Dipole - Dipole Intermolecular Force

$\delta^+ I - Cl \delta^-$

2.5 3.0

↳ 3 - 4 KJ/mol (very weak forces)

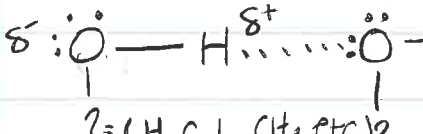
dipole - dipole force

F-H
O-H
N-H
(δ)

Extra-strong dipole - dipole → Hydrogen Bonding

$\delta^- F — H \delta^+ \cdots F^{\delta-} — H \delta^+$ (one HF)

4.0 2.1

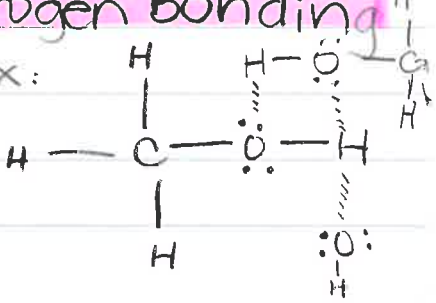


(∞ number of these)

N-H ? — N — H (?)

* higher boiling points (BP)

↳ ex:



Chapter 8 Day 2 (Sections 8.5 and 8.6) (Unit 4) 2 November 2018

1. Which of these ABE formulas is polar?

AB_2	AB_3	AB_2E
AB_4	AB_3E	AB_2E_2
AB_5	AB_4E	AB_3E_2
AB_2E_3	AB_6	AB_5E
AB_4E_2		

2. Which of these molecules is expected to be polar (have a dipole moment)? Start by sketching the Lewis dot structure and thinking in terms of bond dipoles and molecular symmetry.

C_2H_5Cl	C_2Cl_4
C_2HCl_5	CH_2Cl_2
SF_4	PF_5
C_3H_8 (=$CH_3CH_2CH_3$)	CH_3CH_2OH

3. Dichloroethene has the formula $C_2H_2Cl_2$. Draw the Lewis dot structure for this molecule: there are three possible structures for this molecule and all of them are flat with sp^2-hybridized carbon atoms. Sketch a reasonably accurate portrayal of the structure of all three. Identify each structure as polar or non-polar.

4. Sketch the Lewis dot structure for each of these molecules and assign the ABE in order to predict if the types of intermolecular forces present (LDF, dipole-dipole or H-bonding).

(a) phosphorus trichloride

(b) hydrazine, NH_2NH_2

(c) iodine pentafluoride

(d) ozone, O_3, and isostructural with SO_2.

Questions in final exam format (multiple choice):

5. Which molecule has polar bonds, but no net dipole?

A. CF_4 B. CH_3F C. SCl_2 D. PCl_3

6. Which of the following will form hydrogen bonds with water?

A. H_2 B. C_3H_8 C. CH_3OH D. CH_4

7. Which compound exhibits H-bonding?

A. CH_3OCH_3 B. CH_3COCH_3

C. CH_3CH_2OH D. CH_3OOCH_3

8. Which of the following compounds exhibits hydrogen bonding?

A. CH_3F B. CH_3OCH_3

C. $(CH_3)_3N$ D. CH_3CO_2H

Now try these problems from the book:

Section 8.5. (Polar molecules) Prob: 76

Section 8.6. (Intermolecular forces) Problems: 13 – 16, 72, 74, 84, and 86

Skip Sections 8.7 – 8.9

Practice test (pg 317): 10 - 14