

blo I

$$(E)_{2r} : m^2 m^2$$

$$X \in \begin{cases} n^{\text{ème}} \text{ période} \\ (12+z) \text{ ème} \text{ colonne} \end{cases}$$

Semio-métaux : diagonale escalier

in S_z ; $z \in \mathbb{Z}$

lo métaux pauvres : au dessus

de la diagonale escalier

Géné : $x \in \mathbb{N}$

lo métaux : au dessus de la

diagonale escalier :

$$\vec{P}_R = \vec{0} \quad || \quad \vec{P}_R \neq \vec{0}$$

aplati

* famille des gaz rares : $m^2 m^6$
10^{ème} colonne.

* famille des halogènes : $m^2 m^7$
17^{ème} colonne

* famille des chalcogènes : $m^2 m^6$
16^{ème} colonne

Géné lie de molécules
R.L $\Rightarrow$ T_H V.S.E.P.R (AX_mE_n)

Polarité
 $\vec{P}_R = \sum \vec{P}_i$

F.R : arrangement des doublets liants (DL)

et des doublets non liants (D.N.L)

autour de l'atome central (m+n)

m+n=2 : F.R. dte

m+n=3 : F.R. Triangle :

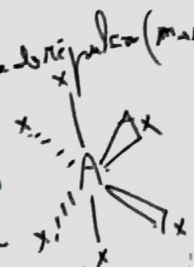
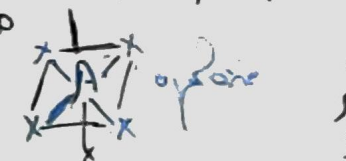
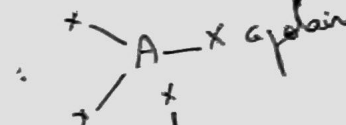
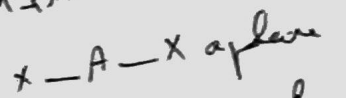
m+n=4 : F.R. tétraèdre :

m+n=5 : F.R. bipyramide à

base triangulaire

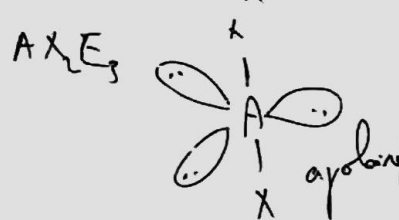
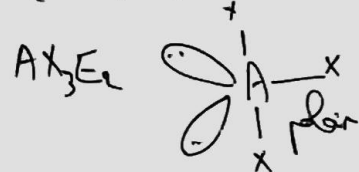
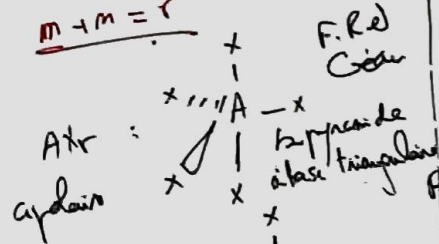
m+n=6 : F.R. bipyramide

carrée

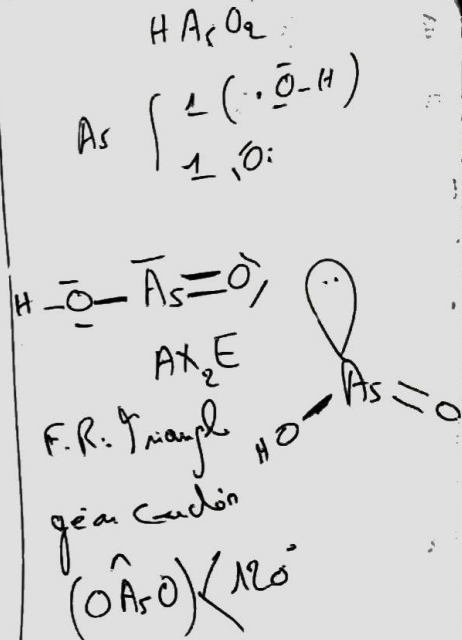
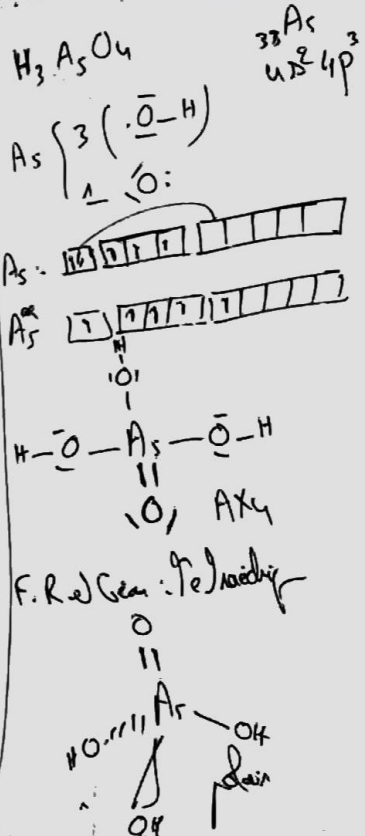
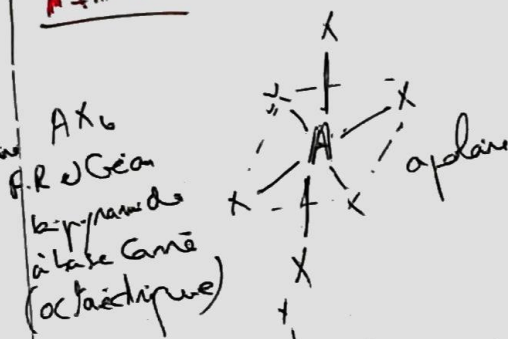


géométrie
(arrangement des DL)

$$m + m = 7$$



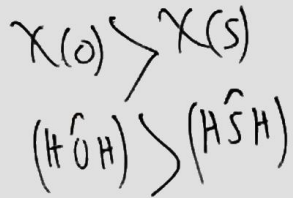
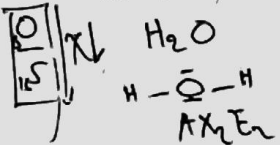
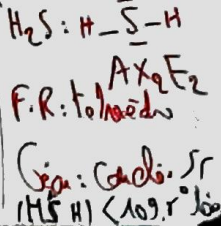
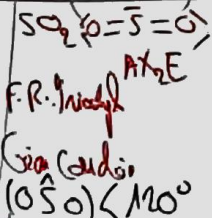
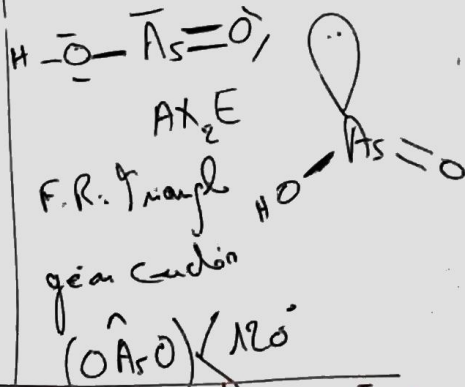
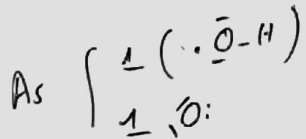
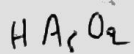
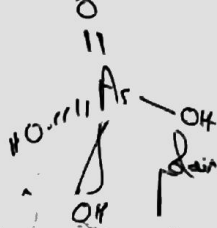
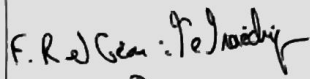
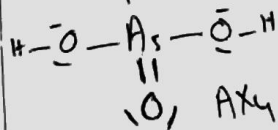
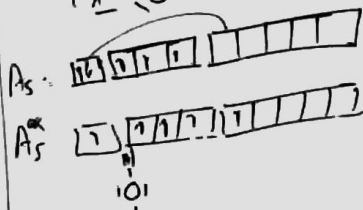
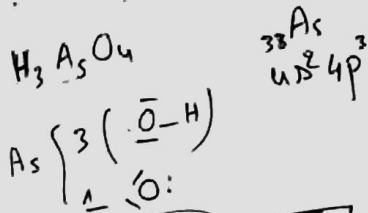
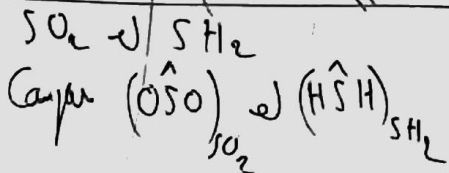
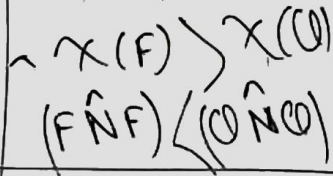
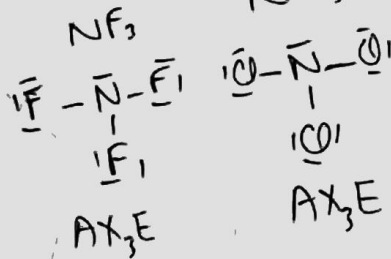
$$m + m = 6$$

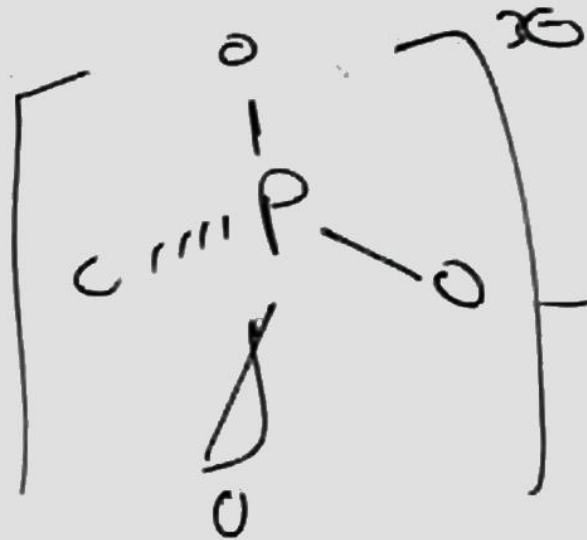
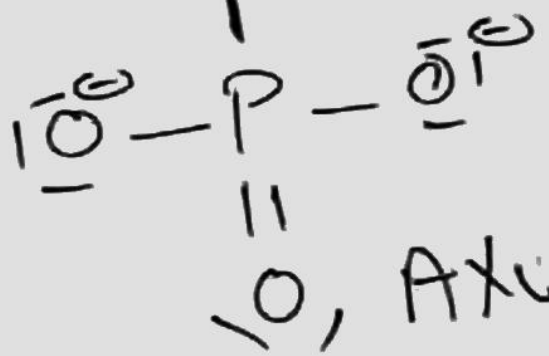
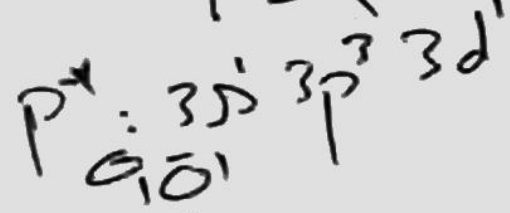
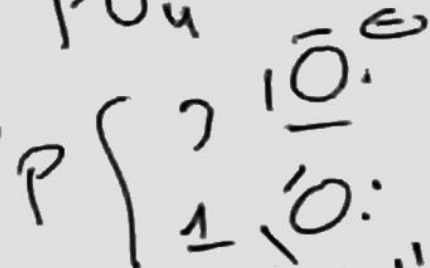
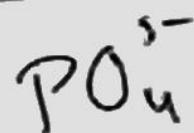
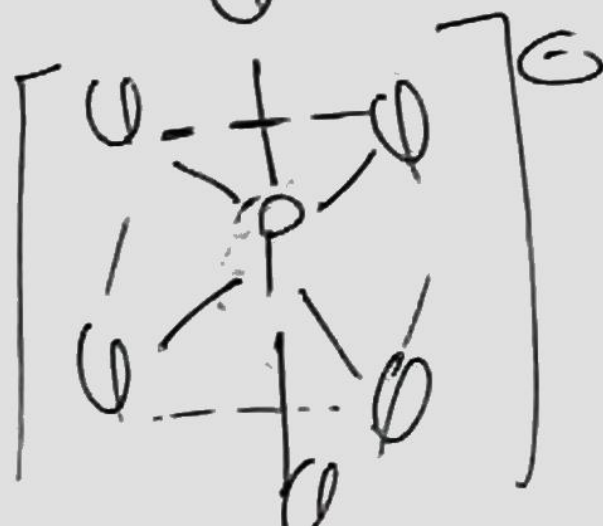
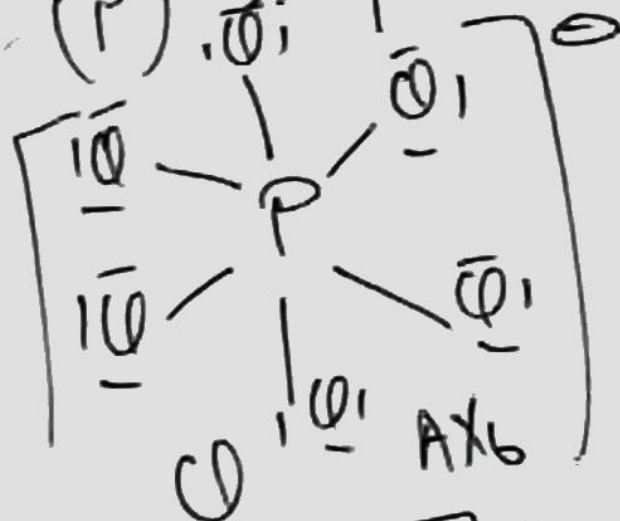
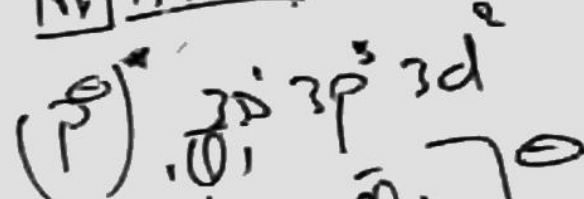
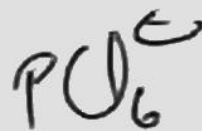
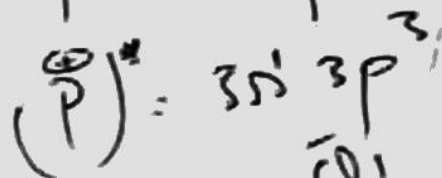
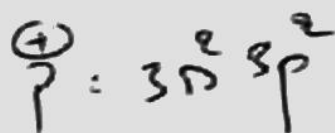
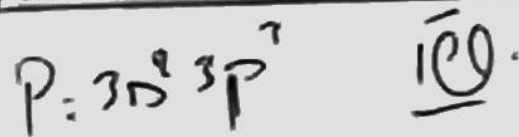


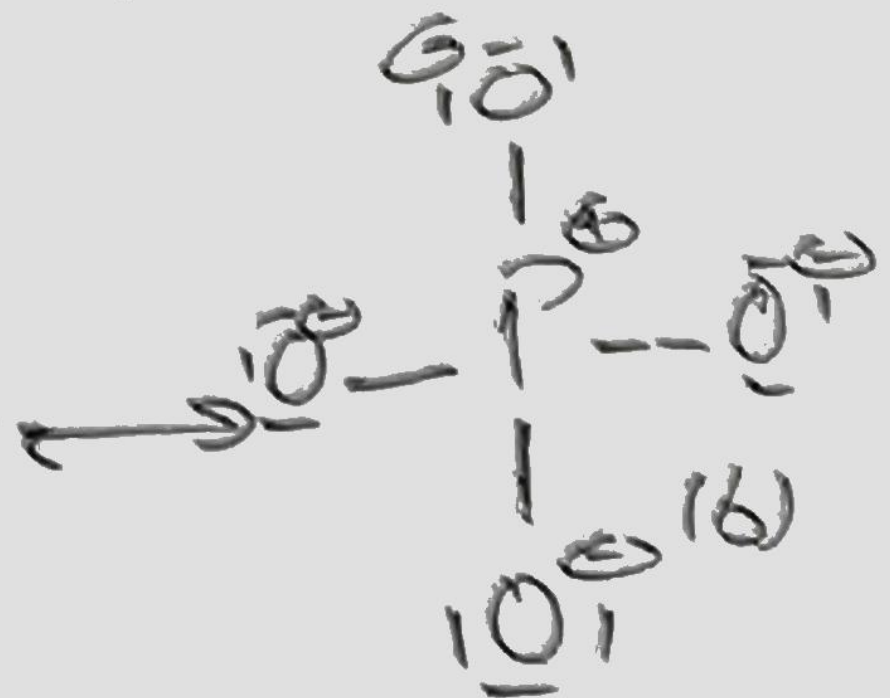
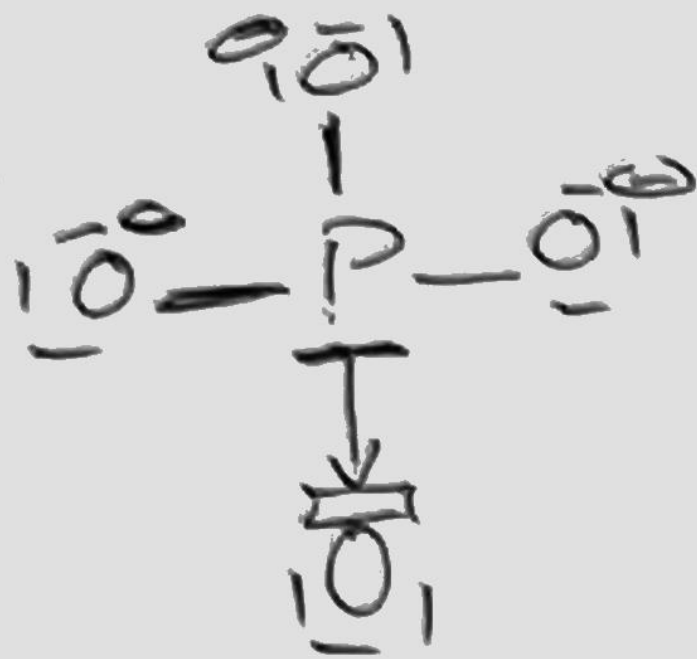
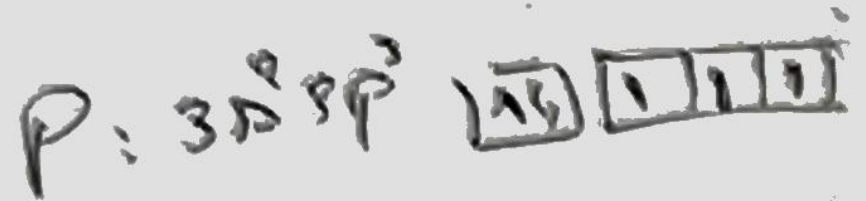
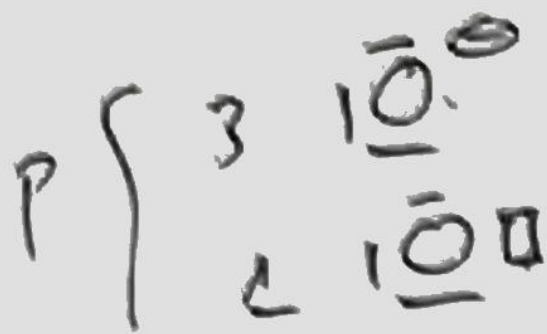
Influence de l'électronégativité
sur l'angle ($\hat{XAX}$)

Pos des molécules en T/R V.S.E.P.R

$\Rightarrow$ convention de laq: $(X \hat{A} X)$
 H_2S

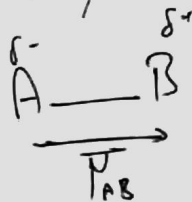
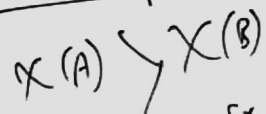

$$* \mathbb{E} \cdot \chi(x) \mathcal{P}; d_{L-L} \mathcal{P}$$






6 R.L. majaitain en cell e- priante
 le minin de charge formelle (i.e.d le
 minin de l'aisa dal ve.

Monomol dipolaire



$\|\vec{P}_{AB}\| = \delta \cdot d_{A-B}$

$\Delta X = |X_A - X_B|$

$\|\vec{P}_{AB}\|$

le liaisons doit être polarisé

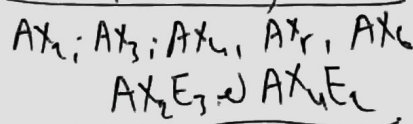
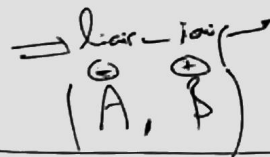
$\Delta X = |X_A - X_B| < 0,4$

$\Rightarrow$ liaisons faiblement polarisées.

$0,4 < \Delta X = |X_B - X_A| < 1,7$

$\Rightarrow$ liaisons fortement polarisées

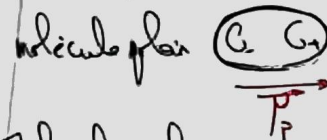
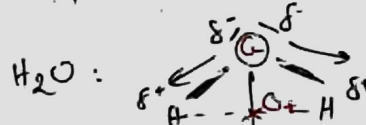
$\Delta X = |X_A - X_B| > 1,7$



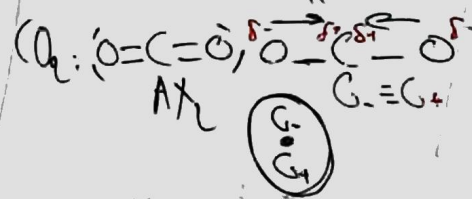
apolariser.

Molécule polaire

$\vec{P}_R = \sum \vec{P}_i \neq \vec{0}$



Molécule apolaire: $\vec{P}_R = \sum \vec{P}_i = \vec{0}$



Interactions intermoléculaires
liaisons faibles.

1/ Liaisons de Van Der Waals
L.V.D.W ($E: 0-10 \text{ kJ mol}^{-1}$)

$\Rightarrow$ Interactions dipolaires

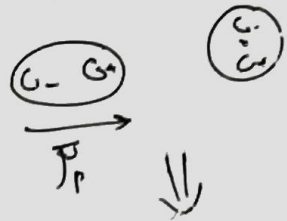
2/ Interactions de Keesom
polaire - polaire



G_- No interaction doit être plus intense
 $\propto \|\vec{P}_P\|$

$\frac{I_{K(H_2O-H_2O)}}{\|\vec{P}_{H_2O}\|} > \frac{I_{K(H_2S-H_2S)}}{\|\vec{P}_{H_2S}\|}$

1/ Interaction Debye
polaire - apolaire



$\parallel P_p \parallel P$; Interaction Debye

2/ Interaction London

apolaire - apolaire

La fluctuation des e- autour
du noyau entraîne une déformation
du nuage électronique que

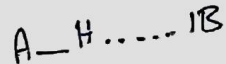
$\Rightarrow \parallel P_{inst} \parallel$

taille de l'espace $P(R^3)$
l'espace devient plus polarisable
 $\parallel P_{inst} \parallel P \cdot (i \cdot d)$

l'interaction London devient
plus intense.

$I_L(I_2 - I_1) \rangle I_L(Br_2 - Br_2) \rangle I_L(Cl_2 - Cl_2)$
Taille (I_1) $\rangle$ Taille (Br_2) $\rangle$ Taille (Cl_2)
les molécules de I_2 : les plus liées $\Rightarrow I_2(s)$
les molécules de Cl_2 : les moins liées $\Rightarrow Cl_2(g)$
 $\Rightarrow Br_2(l)$

liaison hydrogène (10-60 kJ mol⁻¹)

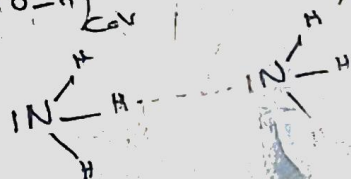
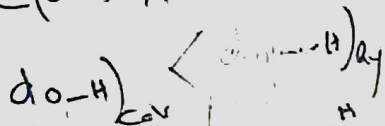
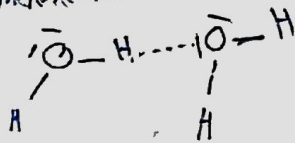


A: ins électronegative } $\Delta \chi$
or $|X_A - X_B| < 1.7$

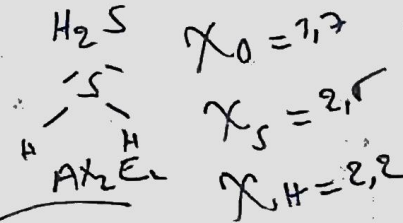
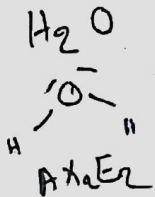
= la liaison covalente A-H.
fortement polarisée.

3 paires d'électrons } H₂O
possède au moins un doublet libre

Généralement A & B: } N, O, F

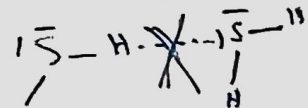
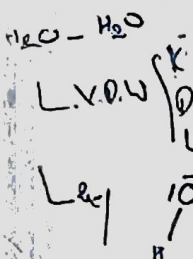


hydrogène



plans

$I_{H_2S-H_2S}$
L.V.D.W



la liaison
S-H est plus
polarisée

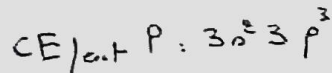
molécule H₂O est beaucoup
plus liée que la molécule H₂S



MP 2010

① $P \in \begin{cases} 3^{\text{ème}} \text{ période } n=3 \\ 15^{\text{ème}} \text{ colonne } p \in \text{bloc } p \\ 3s^2 3p^3 \end{cases}$

$$12 + x = 15 \Rightarrow x = 3$$



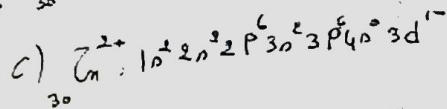
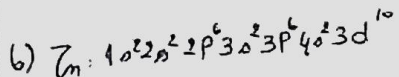
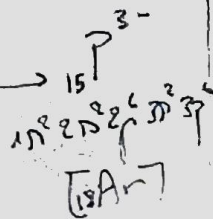
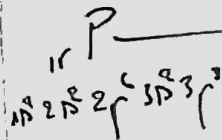
$$Z = nb(e^-)_{\text{interne}} + nb(e^-)_{\text{externe}} \\ = 2 + 8 + 5$$

$$Z = 15$$



② couche de valence: $3s^2 3p^3$
 $\Rightarrow P$ possède 5 e^- de valence

③

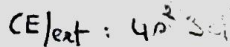


PT 2010

① $Zn \in \begin{cases} 4^{\text{ème}} \text{ période } n=4 \\ 12^{\text{ème}} \text{ colonne } d \end{cases}$

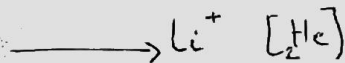
$$CE_{\text{ext}} : ns^2 (n-1)d^x$$

$$2 + x = 12 \Rightarrow x = 10$$

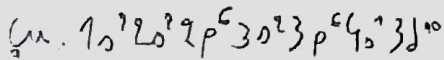
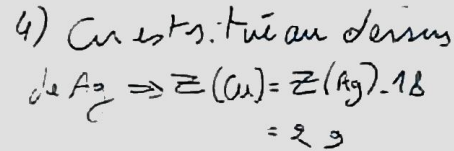
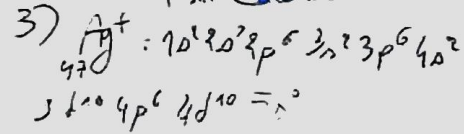
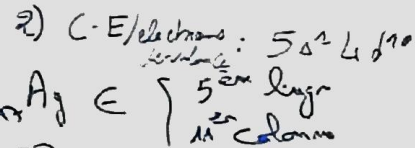
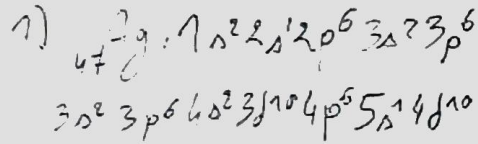


$$Z = nb(e^-)_{\text{interne}} + nb(e^-)_{\text{externe}} \\ = 2 + 8 + 8 + 10 = 30 : 30Zn$$

② $Li : 1s^2 2s^1 : Li \in \begin{cases} 2^{\text{ème}} \text{ ligne} \\ 1^{\text{ère}} \text{ colonne} \end{cases} = \text{métal alcalin}$

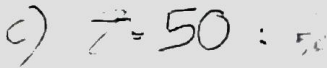
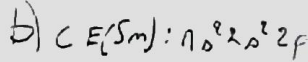
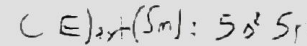


MP 2015

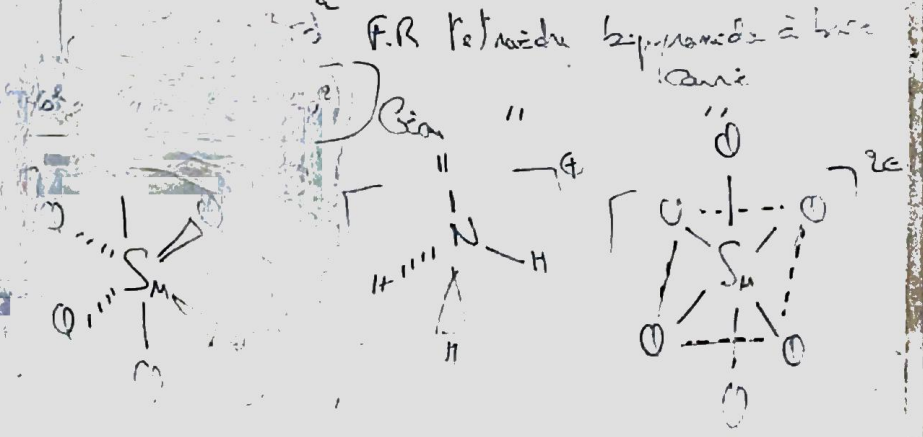
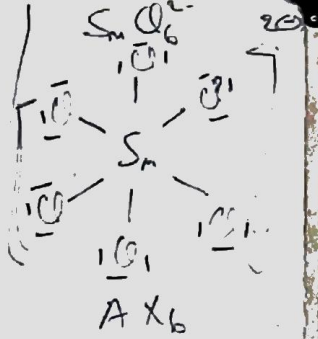
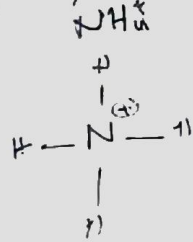
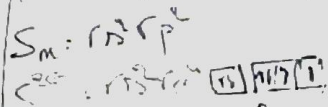
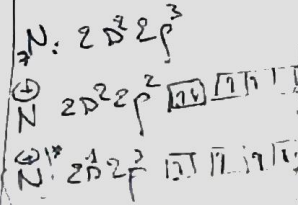


MP 2018

5)a) Sm appartient à la
même colonne que C: $1s^2 2s^2 2p^6$
donc $(Elect(Sm))_{m=0} = 2$
or Sm appartient à la
5^{ème} colonne $\Rightarrow m = 5$



6)

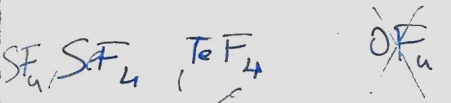


MP 2019

① Les liaisons chimiques



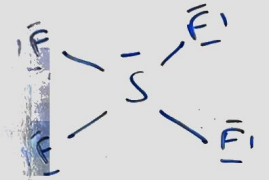
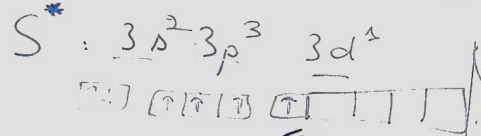
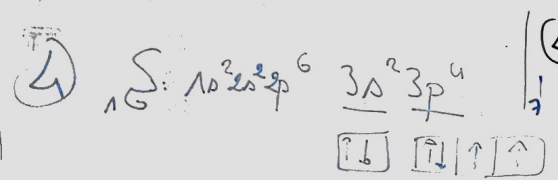
$\Rightarrow C.E)_{ext} : ms^2 mp^4$



existent

OF_4 n'existe pas car O ne peut pas avoir 4 e de valence car O n'a pas la sous couche d (m=2)

S S

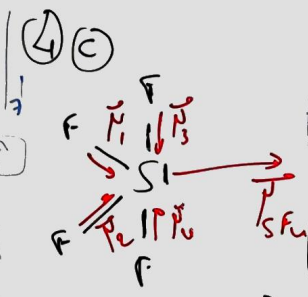


④ ⑤ V.S.E.P.R. AX₄E

F.R. : bipyramide à base triangulaire



$(F \hat{S} F) = 90^\circ$
 $(F \hat{S} F) < 180^\circ$



$\vec{\mu}_{SF_4} = \vec{\mu}_1 + \vec{\mu}_2 + \vec{\mu}_3 + \vec{\mu}_4$

$\vec{\mu}_{SF_4} = (\vec{\mu}_1 + \vec{\mu}_2) \neq \vec{0}$

⑤ SF_4, SeF_4, TeF_4

$\chi_{SF_4}, \chi_{SeF_4}$ et χ_{TeF_4} ont des valeurs voisines donc $\|\vec{\mu}_{SF_4}\| \approx \|\vec{\mu}_{SeF_4}\| \approx \|\vec{\mu}_{TeF_4}\|$

I_K et I_D de molécules SF_4, SeF_4 et TeF_4 sont du même ordre

$R(Te) > R(Se) > R(S)$
 $taille(TeF_4) > taille(SeF_4) > taille(SF_4)$
 or : I_L devient plus intense lorsque la taille de l'espèce augmente

(la polarisabilité augmente)

$I_L(TeF_4) > I_L(SeF_4) > I_L(SF_4)$
 $(TeF_4)_{sol} ; (SeF_4)_l ; (SF_4)_g$