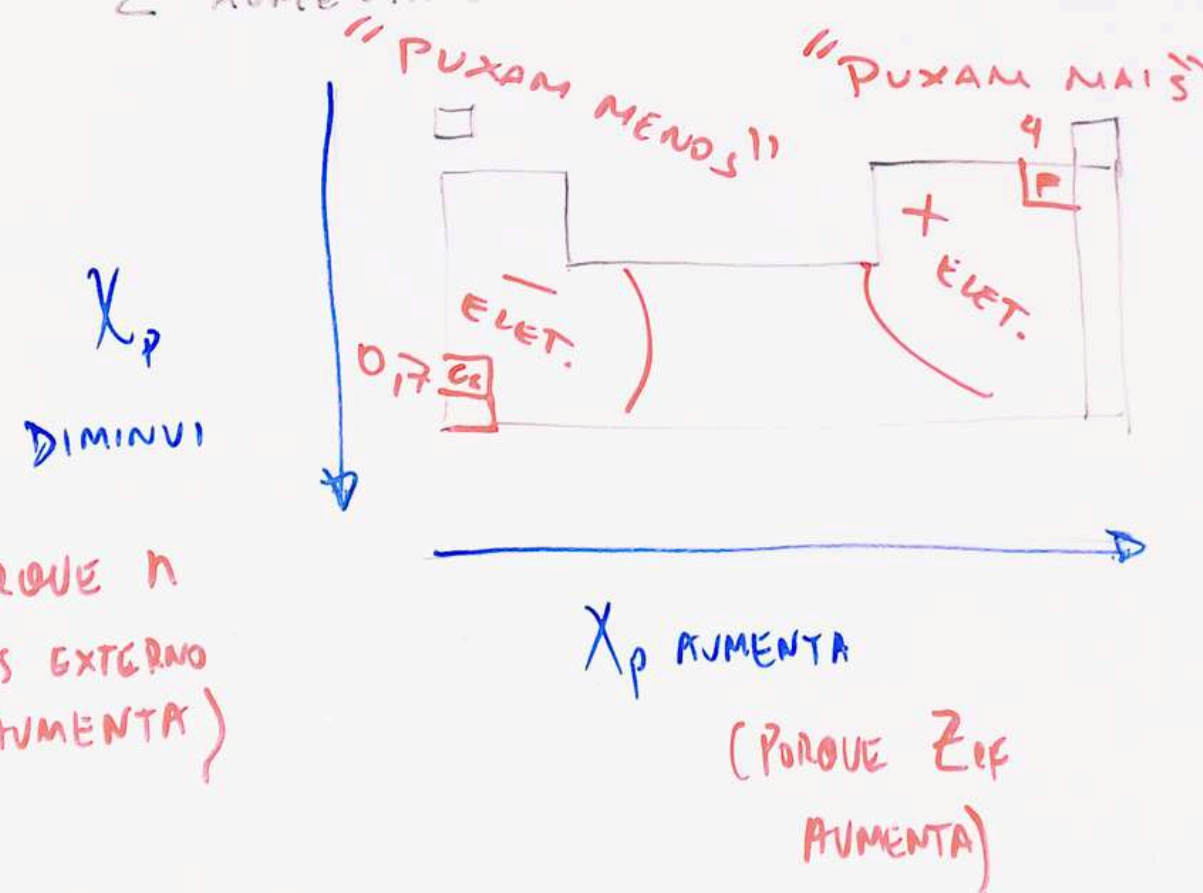


- ELETRONEGATIVIDADE DE PAULING (χ_p): A MAIS CONHECIDA É USAR A ESCALA DE ELETRONEGATIVIDADE, OBTIDA A PARTIR DE DADOS TERMOQUÍMICOS (ENERGIAS NECESSÁRIAS PARA ROMPER LIGAÇÕES ENTRE ÁTOMOS. ESSA ELETRONEGATIVIDADE SE COMPORTA COMO UMA TENDÊNCIA PERIÓDICA: ELA AUMENTA QUANDO Z AUMENTA EM UM PERÍODO E DIMINUI QUANDO Z AUMENTA EM UM GRUPO (VER TABELA DO LIVRO):



- ÁTOMOS MAIS ELETRONEGATIVOS TÊM CARGA NUCLEAR EFETIVA MAIOR E RAIOS MENORES, POIS ISSO MAXIMIZA A INTERAÇÃO DOS ELÉTRONS DE VALÊNCIA COM O NÚCLEO;
- A ELETRONEGATIVIDADE DE PAULING VARIA DE 0,7 (CS) A 4,0 (F), MAS MEMORIZAR TAIS VALORES NÃO É IMPORTANTE. SABER, EM UM GRUPO DE ÁTOMOS, QUAIS SÃO MAIS ELETRO-NEGATIVOS, POR OUTRO LADO, É RELEVANTE NA PREVISÃO DO TIPO DE CADA LIGAÇÃO E A POLARIDADE DA LIGAÇÃO E DA MOLÉCULA. ISSO PODE SER INFERIDO PELA INSPEÇÃO DA TABELA PERIÓDICA.

* ELETRONEGATIVIDADE E TIPOS DE LIGAÇÃO

- CONSIDERE DOIS ÁTOMOS LIGADOS ENTRE SI. PELA DIFERENÇA DE ELETRONEGATIVIDADE ENTRE ELÉS PODÉAMOS INFERIR SE A LIGAÇÃO TEM MAIS CARÁTER COVALENTE (LEVANDO À MOLÉCULAS) OU IÔNICO (FORMANDO SUBSTÂNCIAS SÓLIDAS IÔNICAS)

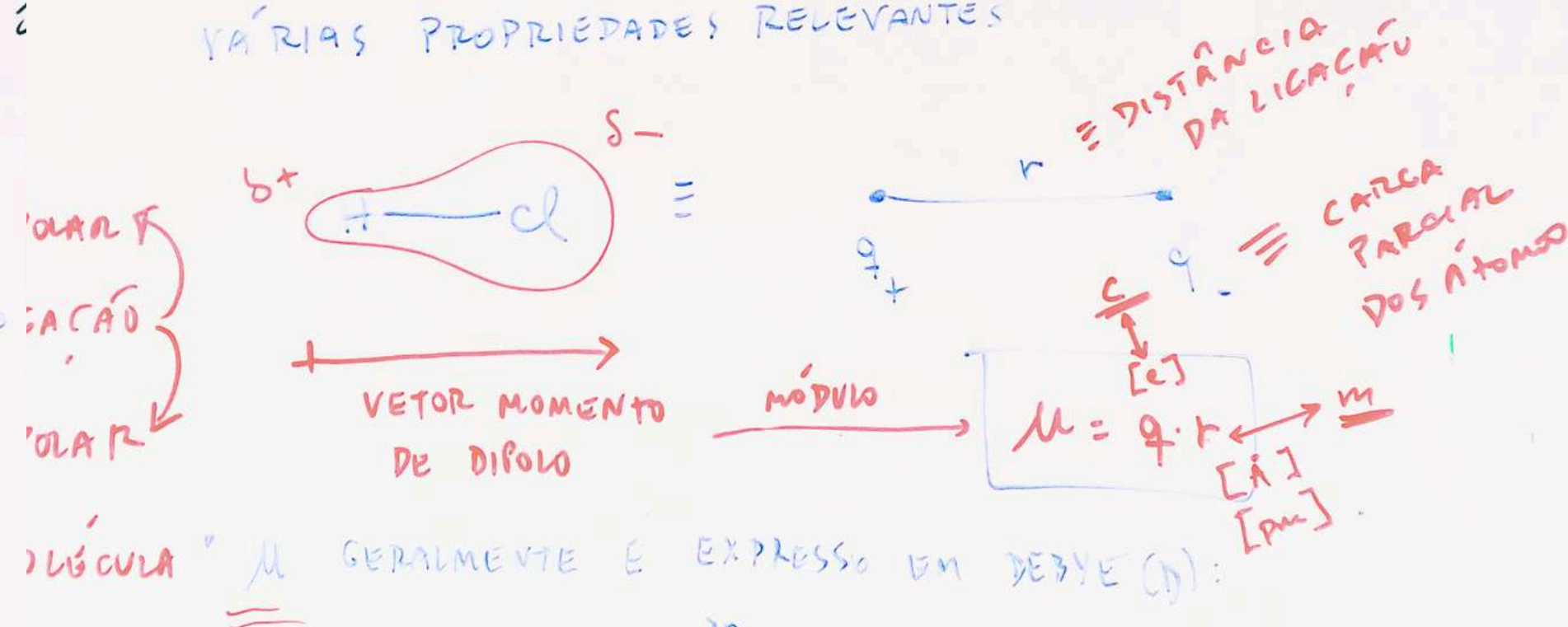
| $\Delta\chi_p$ | 0 | $>0-2\leq$ | >2 |
|--------------------|---------------------------------|---|-----------------|
| LIGAÇÃO | COVALENTE APOLAR | COVALENTE POLAR | IÓNICA |
| EXEMPLO | $\overset{0}{F}-\overset{0}{F}$ | $\overset{\delta+}{H}-\overset{\delta-}{F}$ | $(Li^+) (F^-)$ |
| CARGAS | SEM CARGAS PERMANENTES | CARGAS PARCIAIS | CARGAS TOTAIS |
| TIPO DE SUBSTÂNCIA | MOLECULA | MOLECULA | COMPOSTO IÔNICO |

TAL MÉTODO NÃO FUNCIONA TÃO BEM QUANDO METAIS COM DIFERENTES ESTADOS DE OXIDAÇÃO FORMAM COMPOSTOS. EM GERAL, QUANTO MAIOR O ESTADO DE OXIDAÇÃO DO METAL (SOBRETUDO ACIMA DE +4) MAIS SIGNIFICATIVO O GRAU DE COVALENCIA



* MOMENTO DE DIPOLLO

UMA LIGAÇÃO COVALENTE POLAR PODE SER TRATADA COMO UM DIPOLLO ELÉTRICO, EM QUE AS CARGAS q_+ E q_- ESTÃO SEPARADAS POR UMA DISTÂNCIA r . EM MOLECULAS DIATÔMICAS, COMO A ÚNICA LIGAÇÃO É POLAR, A MOLECULA É DITA POLAR. MOLECULAS POLARES INTERAGEM FORTEMENTE ENTRE SI E COM IÔNS, LEVANDO A VÁRIAS PROPRIEDADES RELEVANTES



GERALMENTE É EXPRESSO EM DEBYE (D):
 $1D = 3,34 \cdot 10^{-30} \text{ C} \cdot \text{m}$

CONSIDERE O LiF : $\mu = 6,28 \text{ D}$
 $r = 1,53 \text{ \AA}$
 $q = ?$

$$\mu = q \cdot r \Rightarrow q = \frac{\mu}{r} = \frac{6,28 \text{ D}}{1,53 \text{ \AA}} \cdot \left(\frac{3,34 \cdot 10^{-30} \text{ C} \cdot \text{m}}{1 \text{ D}} \right) \cdot \frac{1 \text{ \AA}}{10^{-10} \text{ m}} \cdot \frac{1 \text{ e}}{1,60 \cdot 10^{-19} \text{ C}}$$

$$q = \frac{6,28 \cdot 3,34}{1,53 \cdot 1,60} \cdot \frac{10^{-30}}{10^{-29}} \text{ e} = \underline{0,857 \text{ e}}$$

TODA LIGAÇÃO
 IÔNICA TEM PARCELA

COVALENTE

(100% IÔNICA
 NÃO EXISTE)

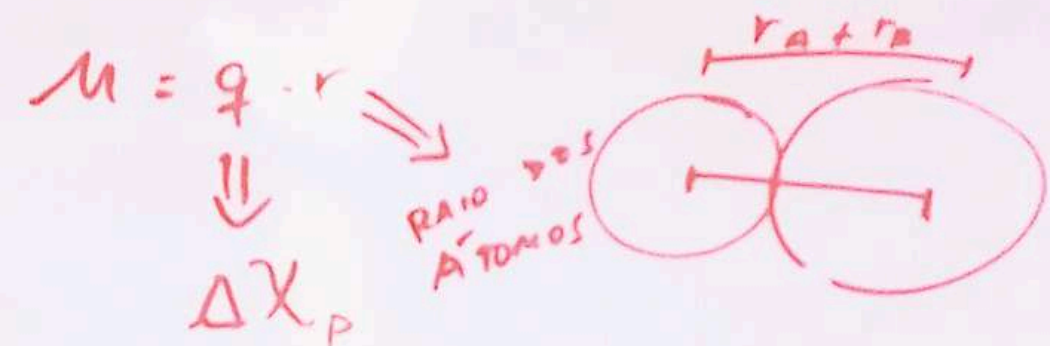
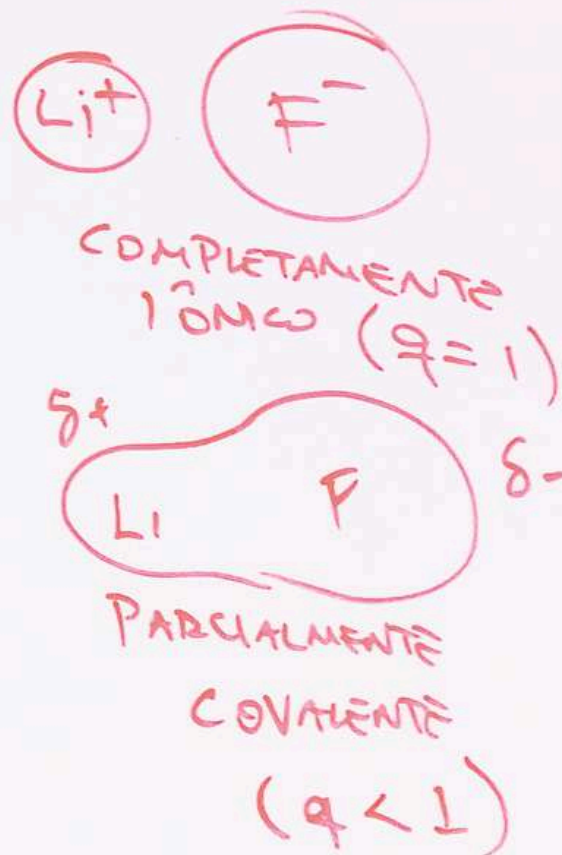
O=O
 F-F
 I-I

100% COVALENTE

A-H

SIM

Cl-Cl



$\Delta\chi_p$ ALTA $\Rightarrow q \uparrow$

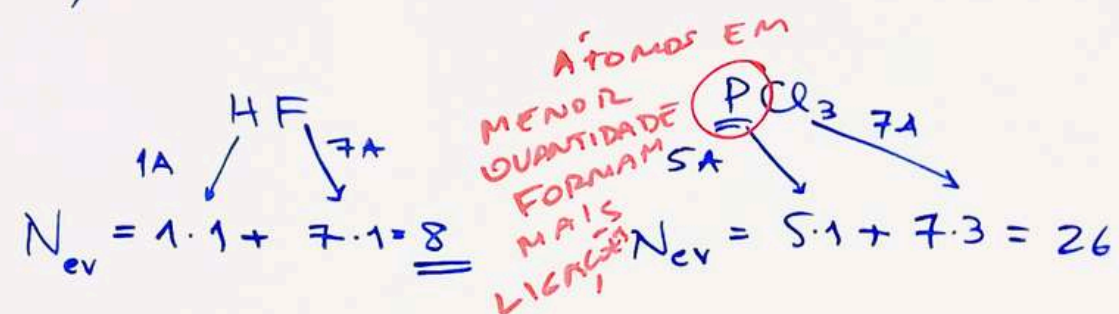
| | $r / \text{\AA}$ | $\Delta\chi_p$ | μ / D |
|--|------------------|---------------------------|------------------|
| $\delta^+ \text{H} - \text{F} \delta^-$ | 0,92 | 1,9 | 1,82 |
| $\delta^+ \text{H} - \text{Cl} \delta^-$ | 1,27 | 0,9 | 1,08 |
| $\delta^+ \text{H} - \text{Br} \delta^-$ | 1,41 | 0,7 | 0,82 |
| $\delta^+ \text{H} - \text{I} \delta^-$ | 1,61 | 0,4 | 0,44 |
| | $r \uparrow$ | $\Delta\chi_p \downarrow$ | $\mu \downarrow$ |
| | | $q \downarrow$ | |

Turma PM

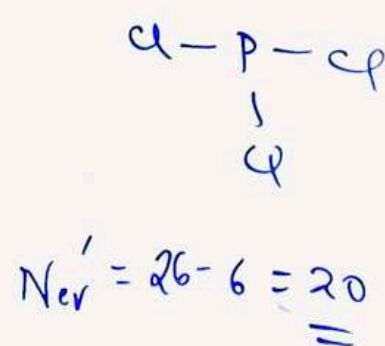
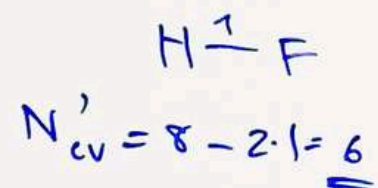
ESTRUTURAS DE LEWIS

DETERMINE ESTRUTURA(S) DE LEWIS DA MOLÉCULA ... HF PCl₃ OH⁻

1) CALCULE O NÚMERO DE E.V. DA MOLÉCULA

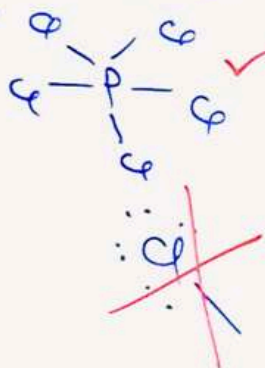
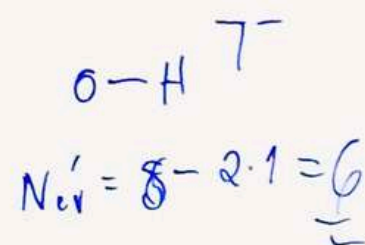


2) CONECTAR ÁTOMOS COM LIGAÇÕES SIMPLES



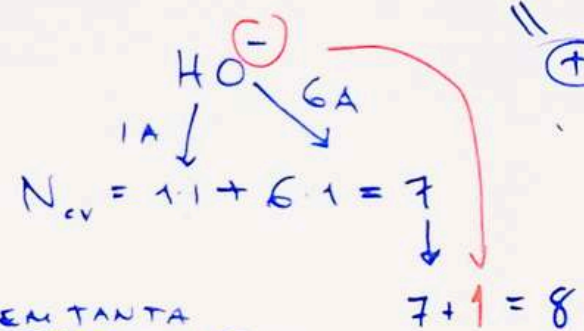
SE TANTA
PRODUTAS COM
OCTETO

ÁTOMOS COM
MAIS LIGAÇÕES
(P. EX.: CENTRAL)



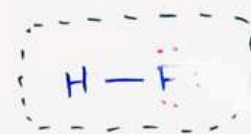
CARGA = 0 OK

CARGA ≠ 0 → ADICIONA E⁻ RETIRA E⁺



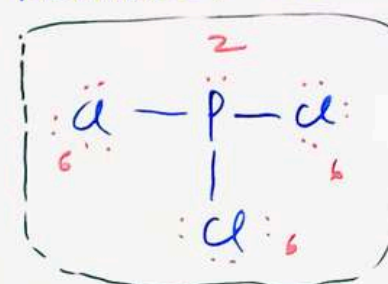
TDM
↓
ELETROONS
SÃO DE
TODOS

3) USAR ELÉTRONS RESTANTES PARA PREENCHER OCTETOS

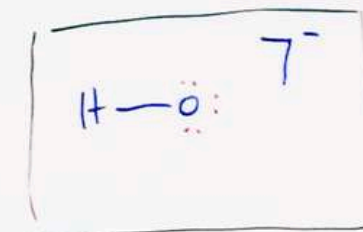


PREENCHEU OCTETO
SO UMA ESTRUTURA

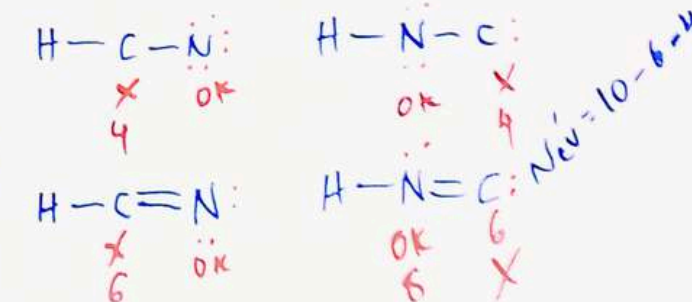
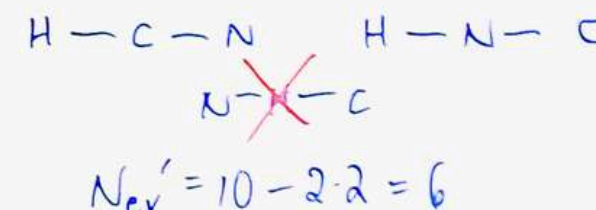
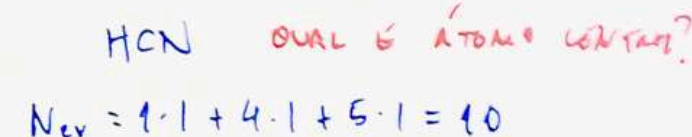
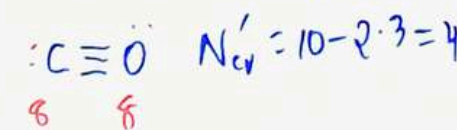
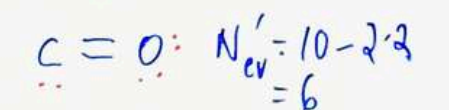
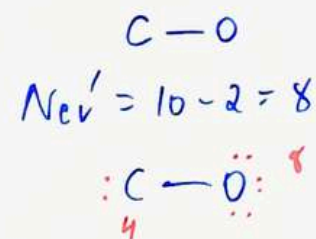
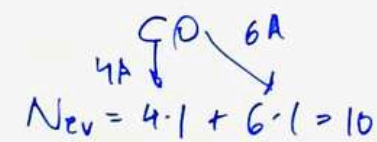
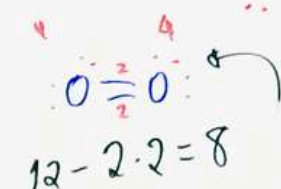
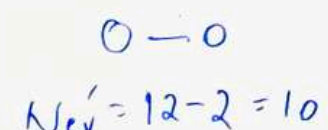
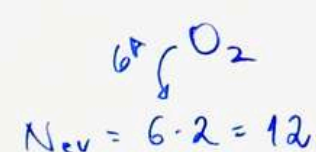
PARA AQUI



OK!



4) SE FALTAR ELÉTRONS PARA COMPLETAR OCTETO: FAZER DUPLAS E TRIPLAS



ESTRUTURAS DE LEWIS

USANDO TRIPLA: $\text{H}-\overset{\textcolor{red}{8}}{\text{C}}\equiv\overset{\textcolor{red}{8}}{\text{N}}:$ $\text{H}-\overset{\textcolor{red}{8}}{\text{N}}\equiv\overset{\textcolor{red}{8}}{\text{C}}:$

$N_{\text{cr}} = 10 - 4 \cdot 2 = 2$

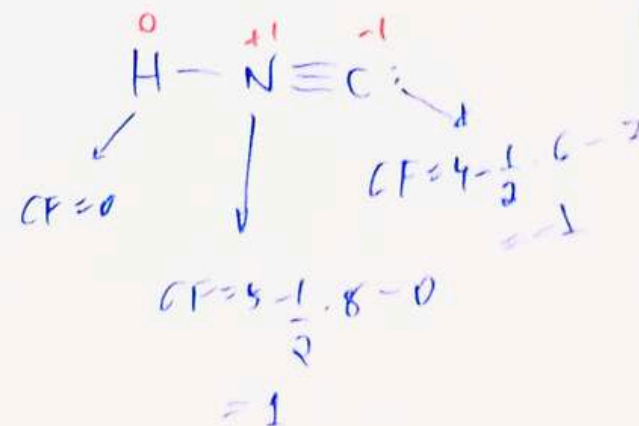
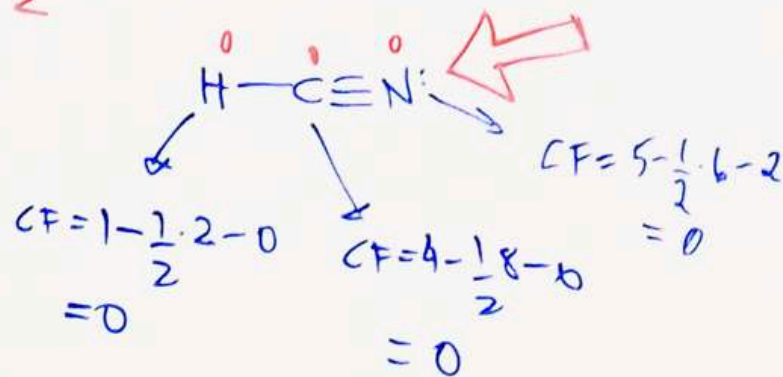
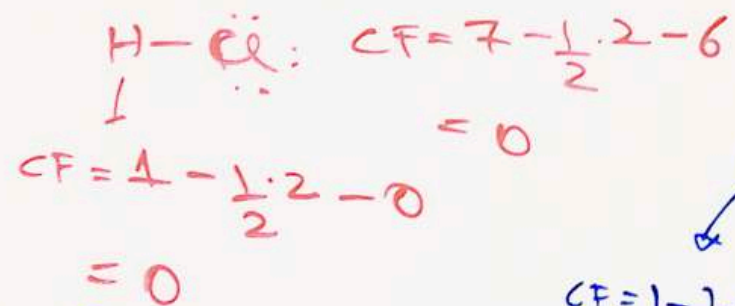
ESCOLHER
ESTATUTURA
COM MENOR
SEPARAÇÃO
DE CARGAS

5) SE MAIS DE UMA ESTRUTURA É POSSÍVEL, CALCULE CARGAS FORMAIS

$$\text{CARGA FORMAL} = \text{N}^\circ \text{ DE ELÉTRONS DE VALENÇA} - \frac{1}{2} \left(\text{N}^\circ \text{ DE ELÉTRONS LIGADOS} \right) - \left(\text{N}^\circ \text{ DE ELÉTRONS LIVRES} \right)$$

CARGA QUE
ATÓMO
TERIA
SE LIGAR
FOSSSE
ROMPIDA
EQUIVALENTEMENTE

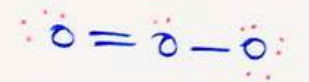
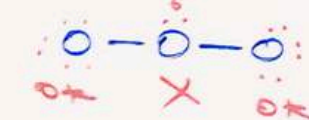
$$CF = V - \frac{1}{2}B - L$$


$$\begin{array}{c} \text{Na} \cdot \quad \cdot \text{H} \\ \text{Na}^+ \quad \text{H}^- \end{array}$$

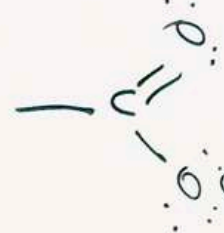
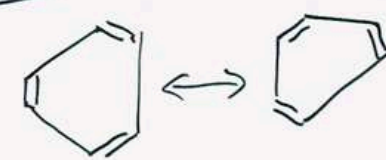
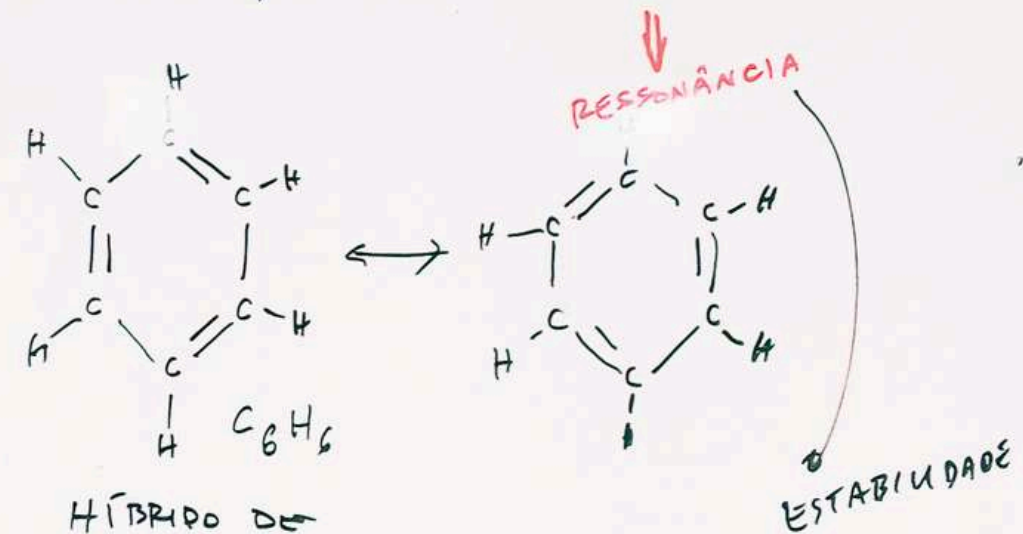
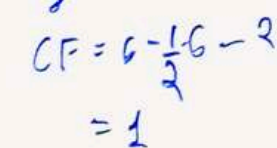
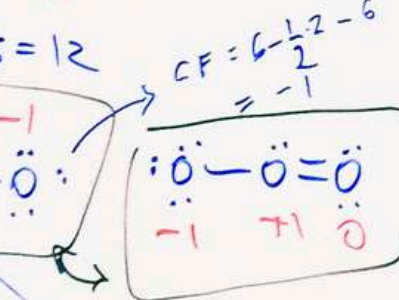
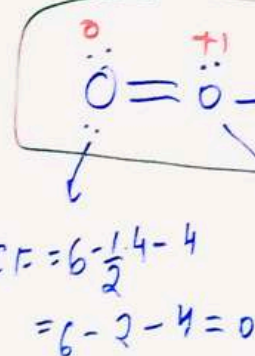
6) QUANDO MAIS DE UMA E.T. PARA POSSUI O MESMO NÚMERO DE ÁTOMOS COM MESMA CARGA FORMAL, TODAS SÃO VÁLIDAS

$$N_{ev} = 6 \cdot 3 = 18$$

$$N_{ev} = 18 - 4 = 14$$



$$\underline{N_{ev}} = 18 - 6 = 12$$



C, N, O → OCTETO
B, Be, Si, Cl → CARCA FORMADA

FAÇA AS ESTRUTURAS DE LIGAMIS DAS MOLECULAS A SEGUIR

- 1) Cl_2 , H_2 , CH_4 , HF , Scl_2 , NH_3 , H_2O , FCl
- 2) CH_3^+ , BH_4^- , NH_4^+ , H_3O^+ , ClO
- 3) N_2O_5 , N_2O , O_3 , NO_2 , CO_2 , SO_2 , NO , ClH_2O , C_2H_2 ,
 C_2H_4 , CO , COCl_2
- 4) NO_3^- , CO_3^{2-} , HCO_3^- , ClO_3^- , SCN^- , ClO_2^- , MnO_4^- , NO^+ ,
 CO^+ , ClO_4^- , $\text{Cr}_2\text{O}_7^{2-}$, $\text{P}_2\text{O}_7^{4-}$
- 5) BeH_2 , BF_3 , Scl_6 , PCl_5 , PCl_3 , XeF_4
- 6) PCl_4^+ , PCl_6^- , BO_3^{3-} , ICl_4^- , SiO_4^{4-}
- 7) SO_3 , PO_4^{3-} , SO_4^{2-} , S_2O_3^- , $\text{S}_2\text{O}_8^{2-}$, BrO_3^-

Turma PM

Fórmula: LiF

ESTRUTURAS DE LEWIS

QUAIS TIPOS DE LIGAÇÃO (SIMP., DUPLA, ...)
PARS LIGADAS ? / CADA ÁTOMO

QUEM ESTÁ LIGADO COM QUEM

CARGAS DOS ÁTOMOS

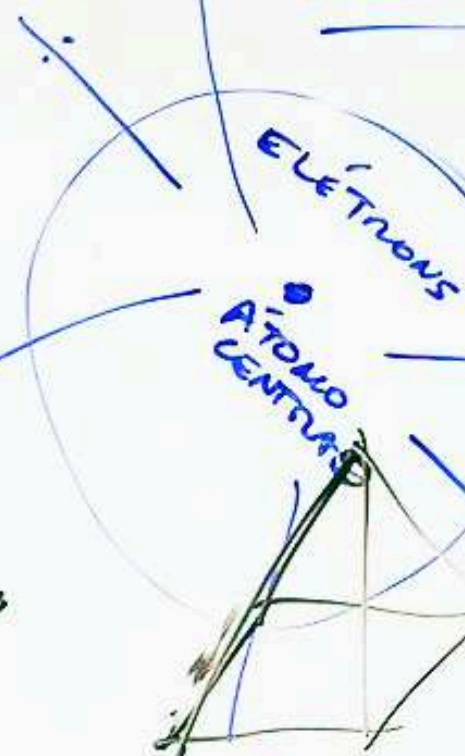
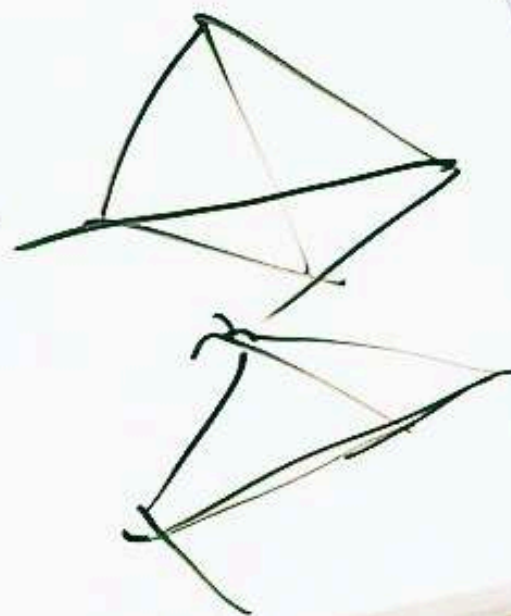
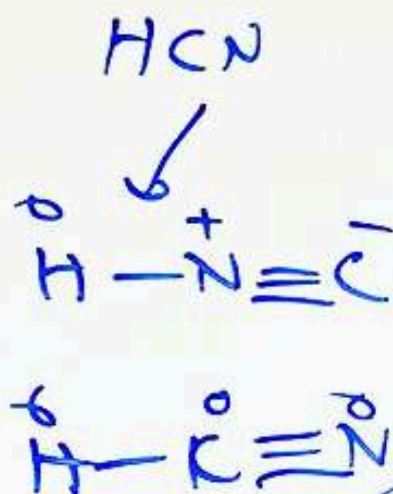
DISTRIBUIÇÃO DE CARGA

DA LIGAÇÃO

FALTA: TAMANHO, FORMA, DISTRIBUIÇÃO
DE CARGA DA MOLÉCULA

RAIOS,
DISTÂNCIAS
TAMANHOS
DE LIGAÇÃO

REPULSÃO
ENTRE
ELÉTRONS



ÁTOMOS QUE OBEDEM
O OITO

180°

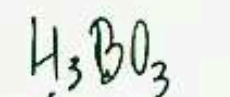
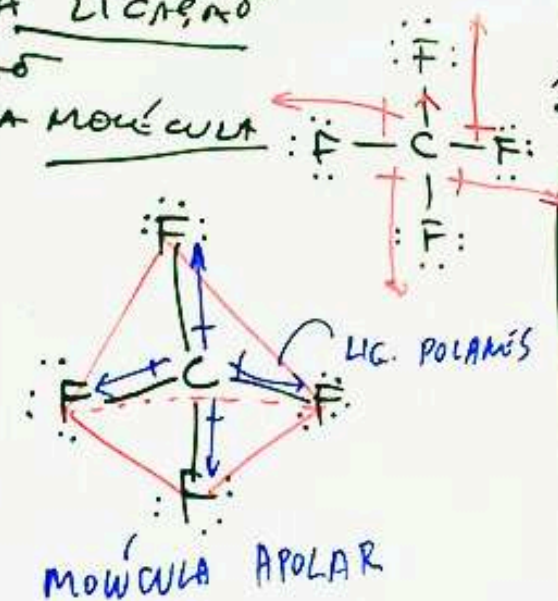
LINHA

TRIÂNGULO

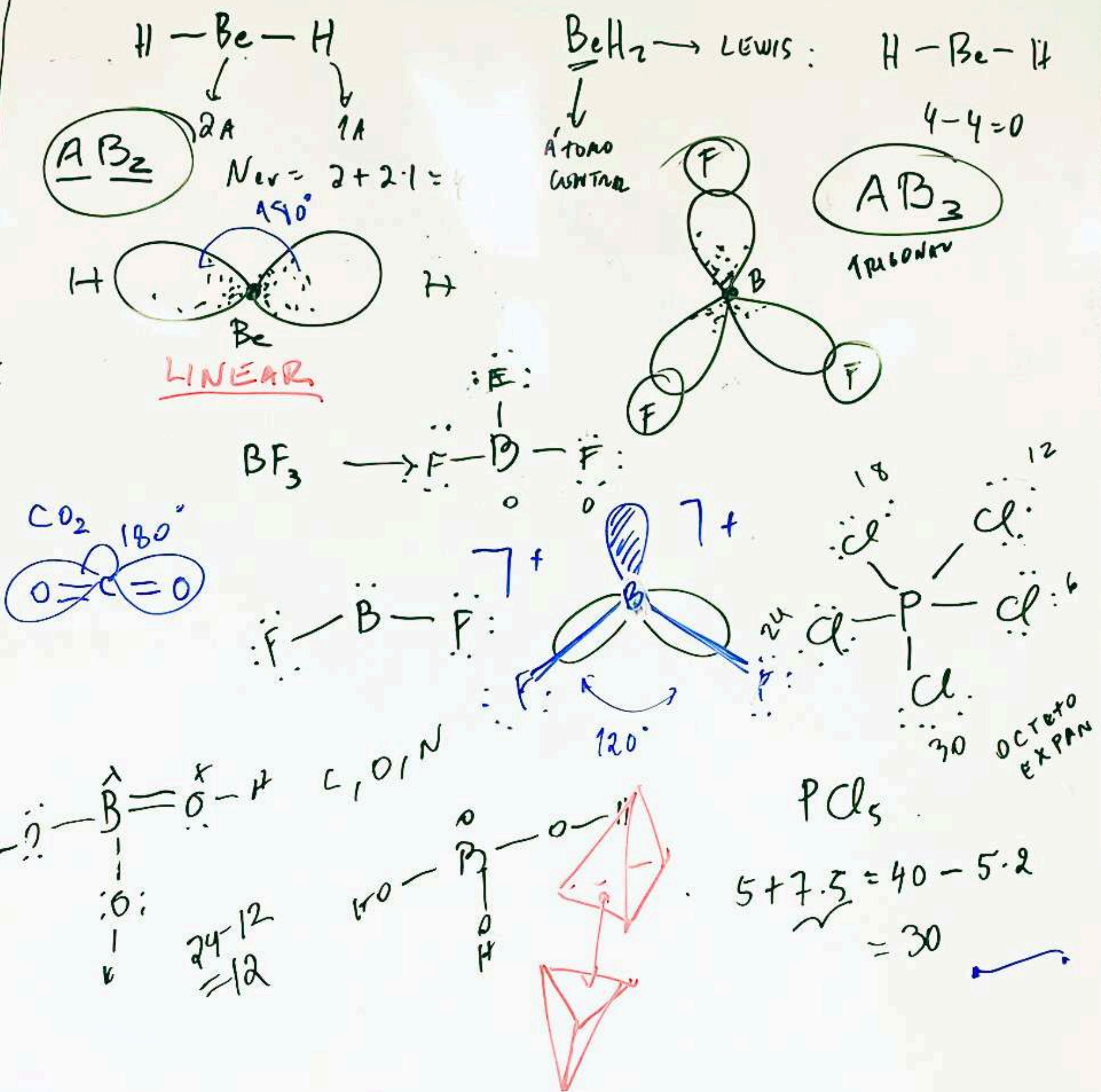
TETRAEDRO

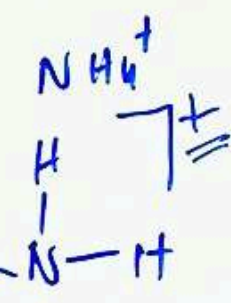
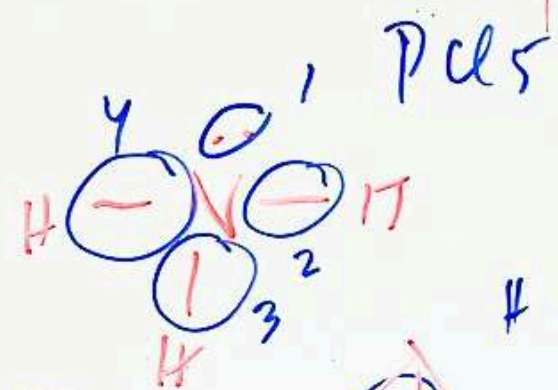
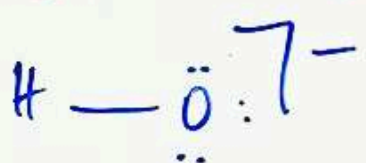
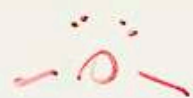
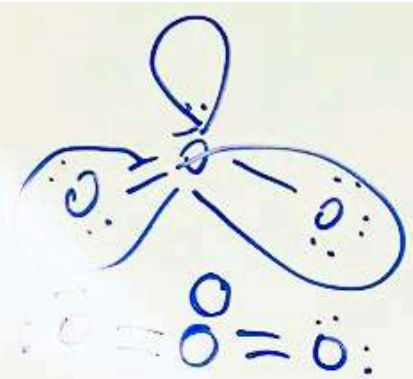
BIPINÁMIDE
TRIGONAL

OCTAEDRO



$$\begin{array}{r} 3 + 3 + 3 \cdot 6 \\ \hline 18 \\ \hline 24 \end{array}$$



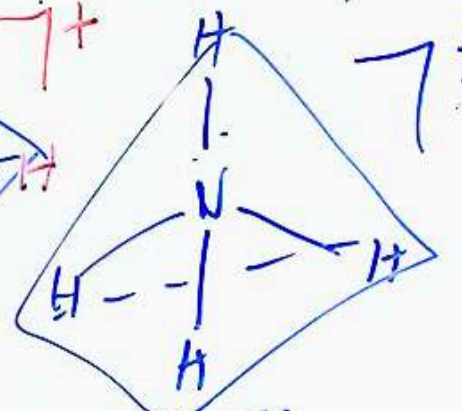


$$5 + 4 - 1 = 8$$

$$8 - 4 \cdot 2 = 0$$



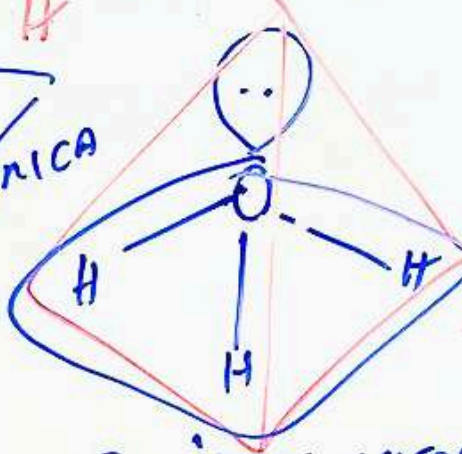
PIRAMIDE TRIGONAL



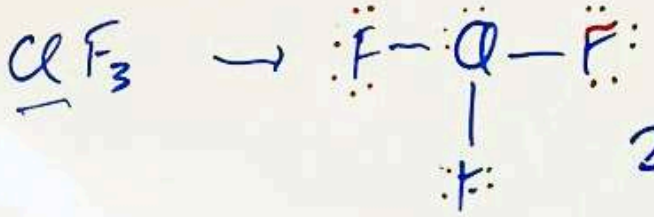
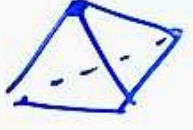
TETRAEDRICA



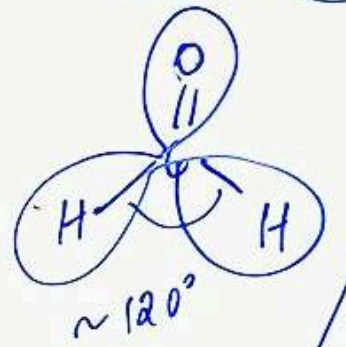
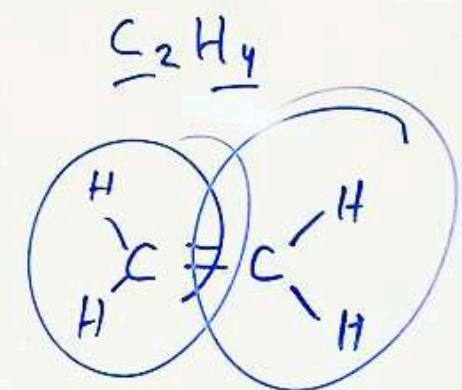
TETRAEDRICA



PIRAMIDE TRIGONAL

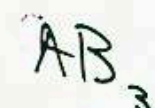


$$28 - 6 = 22$$



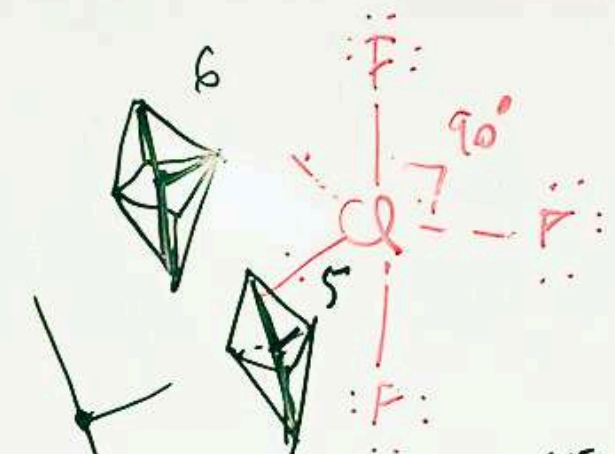
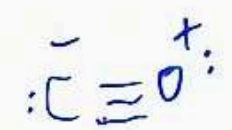
$\sim 180^\circ$

Forma de T



TRIGONAL

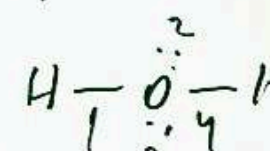
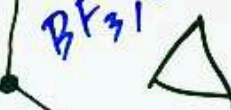
PIRAMIDE TRIGONAL



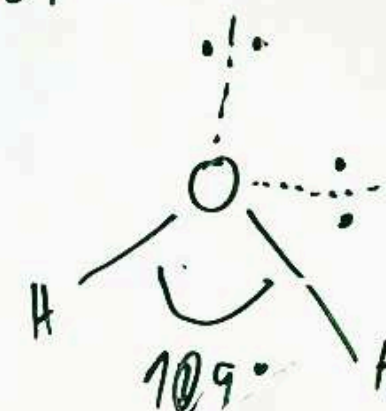
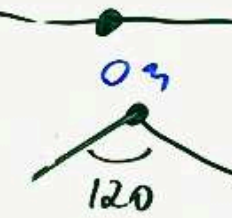
PIRAMIDE TRIGONAL

LINEAR

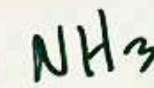
ANGULAR



4 DOMINIOS ELECTRONICOS



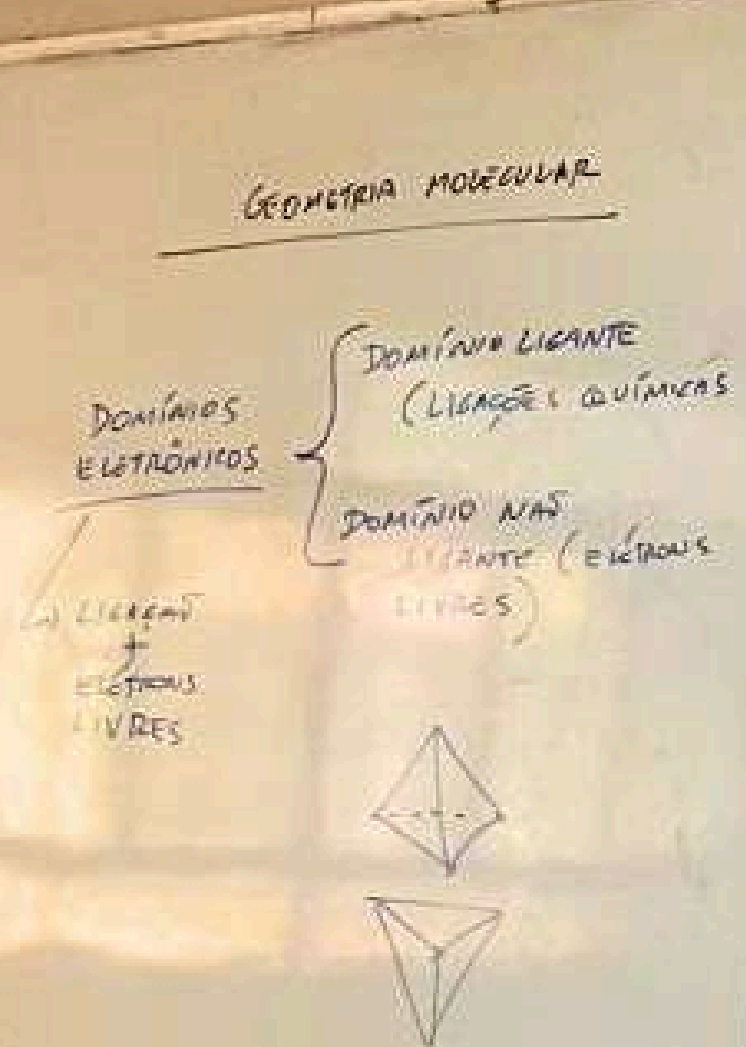
109°



C, N, O OCTETO



Turma MT

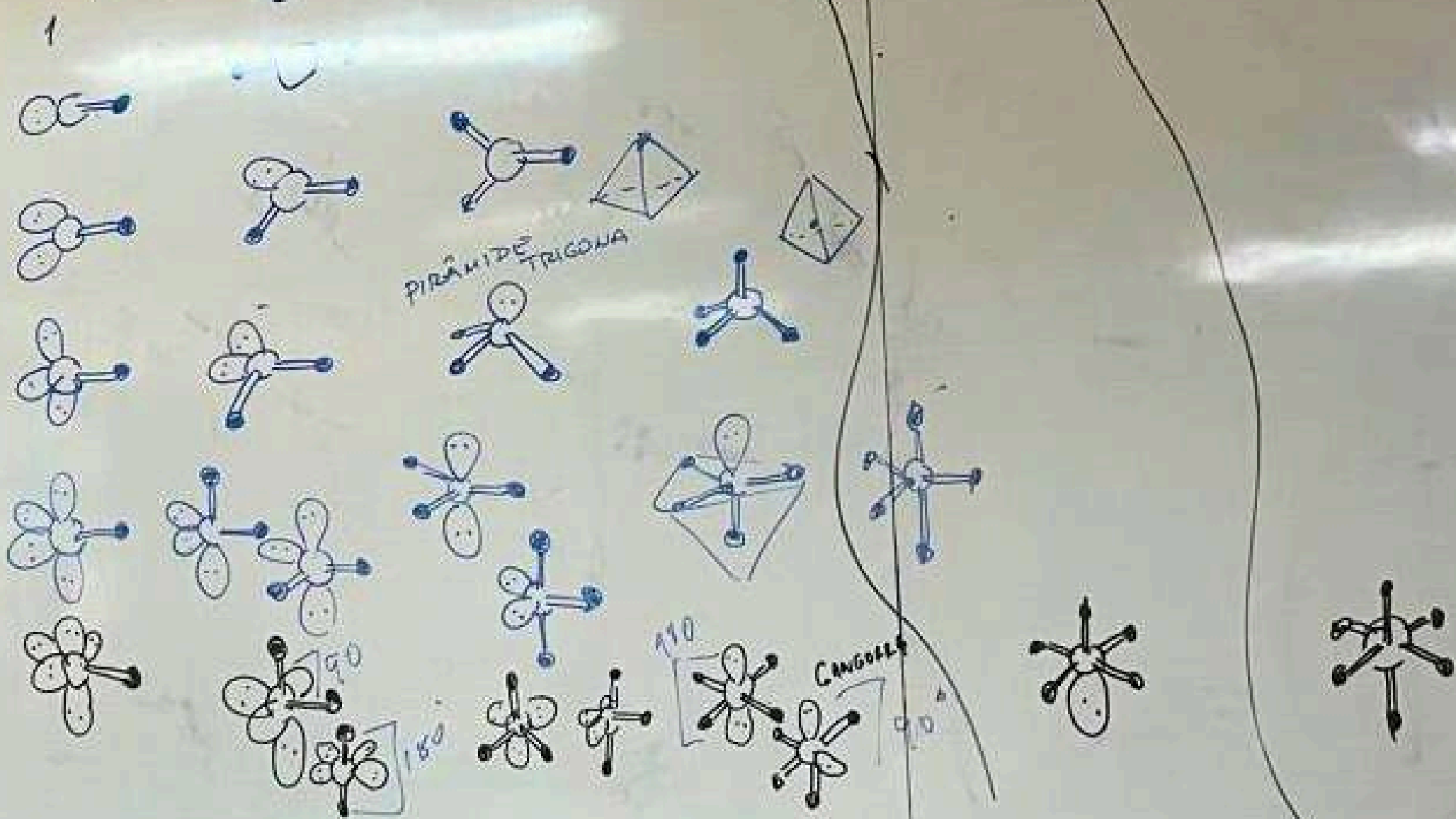


N.º DE DOMÍNIOS ELETRÔNICOS

FORMAS



DOMÍNIO LIGANTES

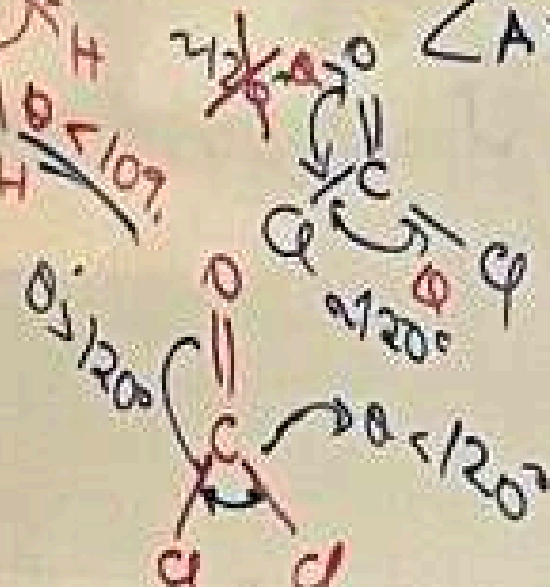
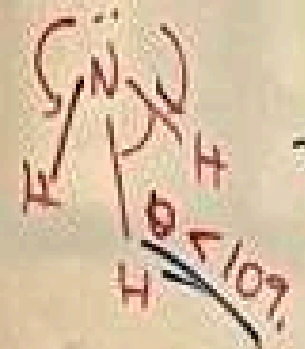
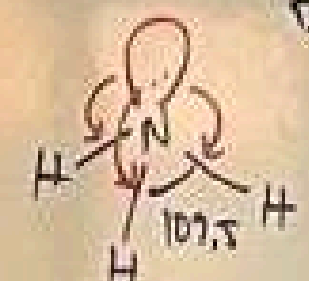
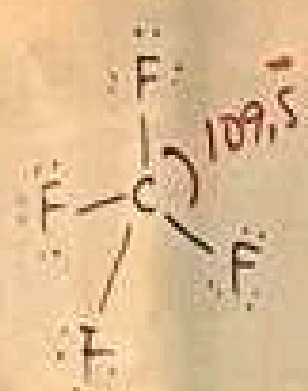


GEOMETRIA MOLECULAR

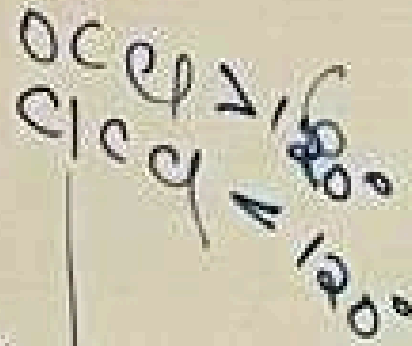
4) DETERMINE OS ÂNGULOS DE LIGAÇÕES. CONSIDERE:

LIBRAÇAS SIMPLES < PARES DE ELÉTRONS
REPULSÃO < LIGAÇÕES MÚLTIPLAS

MODELO DE REPULSÃO DOS PARES DE ELÉTRONS DA CAMADA DE VALÊNCIA (VSRPE)



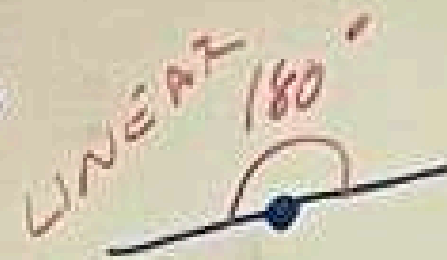
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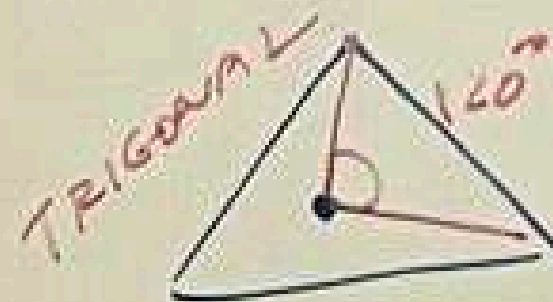
N.º DE DOMÍNIOS ELETRÔNICOS

FORMAS

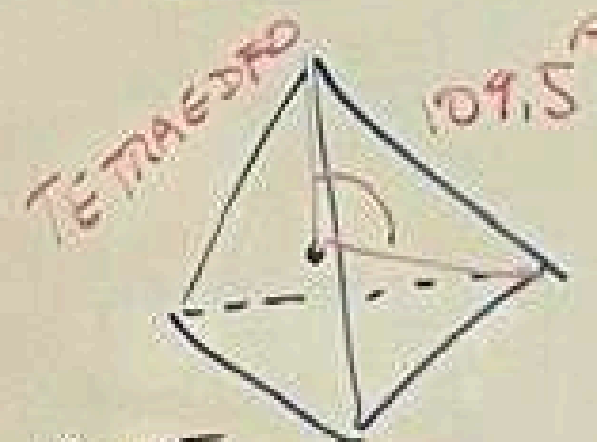
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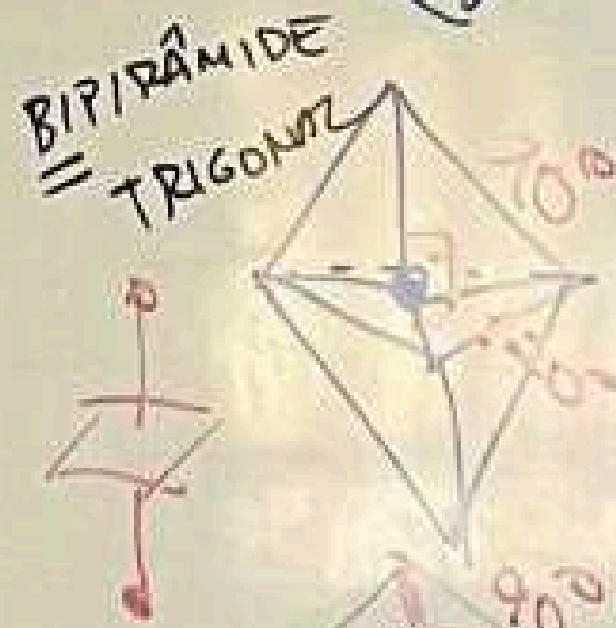
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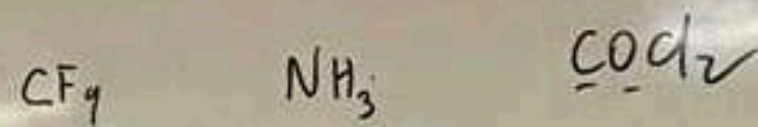
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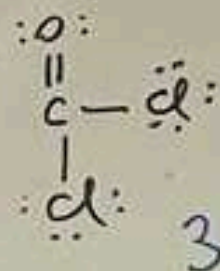
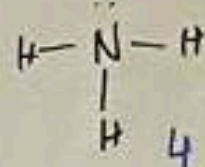
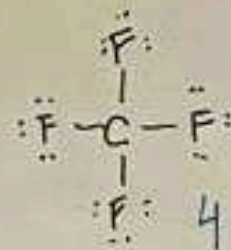
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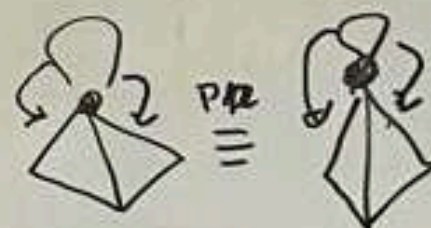
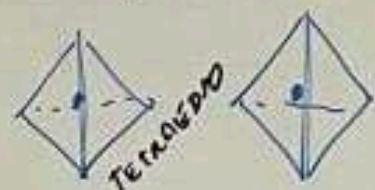
• DETERMINANDO GEOMETRIA MOLECULAR



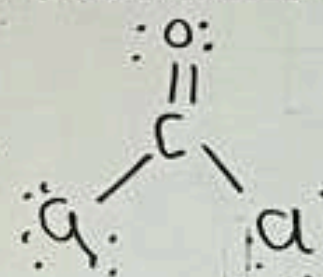
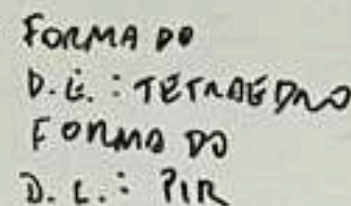
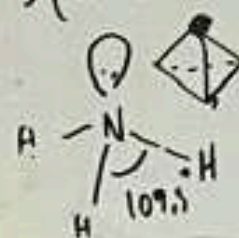
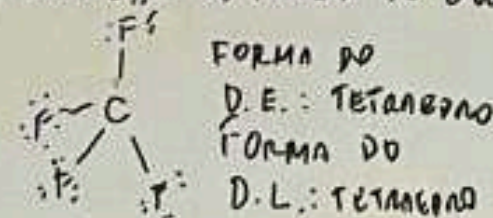
1) ESTRUTURAS DE LUVIS



2) QUANTOS DOMÍNIOS ELETRÔNICOS



3) COLOCAR OS PARES DE ELÉTRONS (L. OU NL.) NOS DOMÍNIOS ELETRÔNICOS



FORMA DO D.E.: TRIANGULAR
FORMA DO D.L.: TRIANGULAR

GEOMETRIA MOLECULAR

4) DETERMINE OS ÂNGULOS DE LIGAÇÃO. CONSIDERE:

LIBRAÇÃO SIMPLES
REPULSÃO

PAIRES DE ELÉTRONS

LIBRAÇÃO MÚLTIPLAS

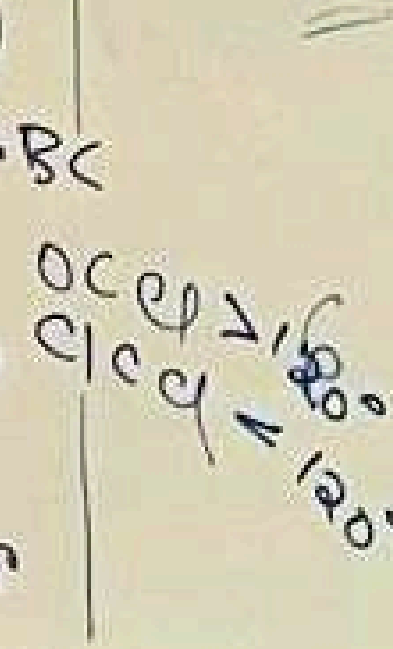
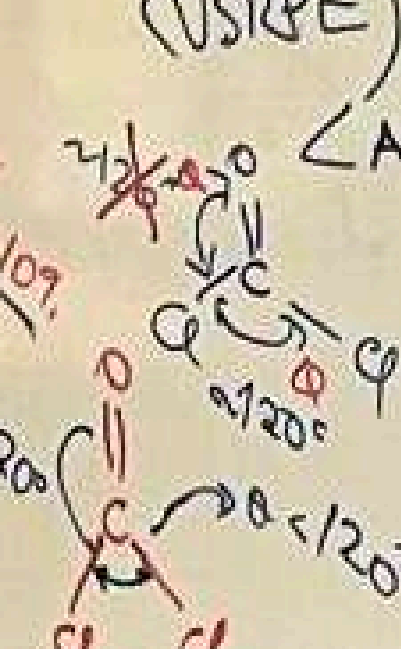
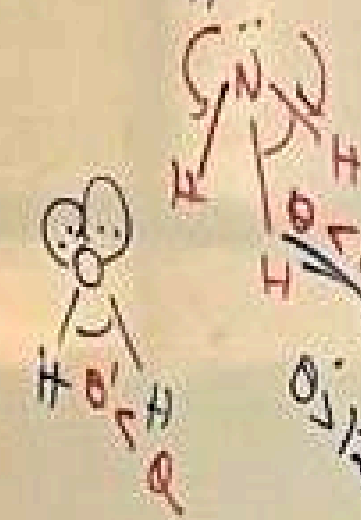
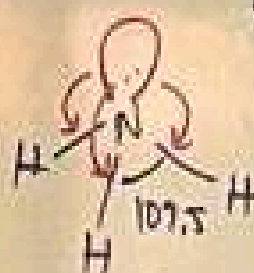
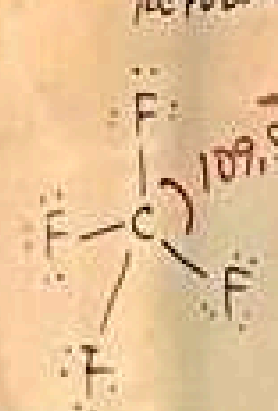
MODELO DE REPULSÃO

DOS PARES DE ELÉTRONS

DA CAMADA

DE VALÊNCIA

(VSEPR)



N.º DE DOMÍNIOS ELETRÔNICOS

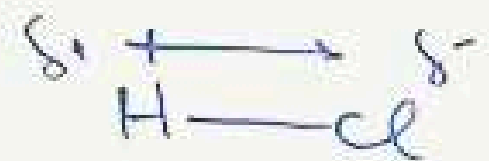
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3

4

5 BIP

5) OBTENHA O MOMENTO DE DIPLO DA MOLECULA



MOMENTO DE DIPLO DA LIGAÇÃO

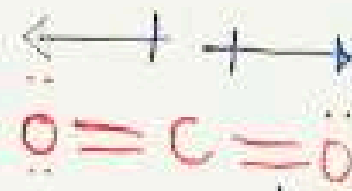
DIFERENÇA DE ELETRONEGATIVIDADES (ATOMOS)

MOMENTO DE DIPLO DA MOLECULA

DEPEND. DE DIF. E AX

+ GEOMETRIA MOLECULAR

X



$\mu = 0$

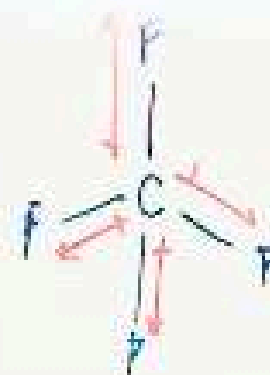
molécula polar

ligação polar



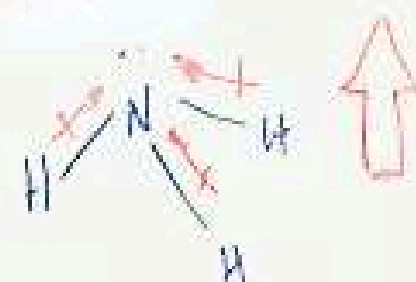
molécula polar

$\mu \neq 0$

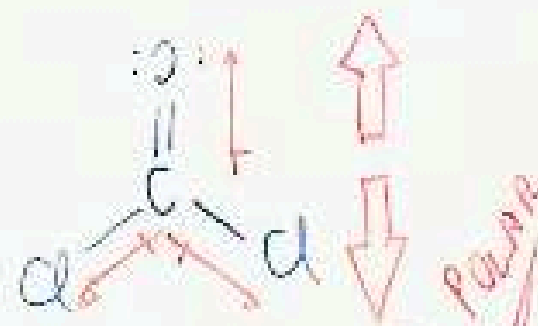


$\mu = 0$

molécula polar



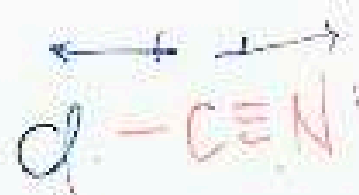
molécula polar



$\mu = 0$

$\mu \neq 0$

polar



Turma PM

GEOMETRIA MOLECULAR

5) DETERMINE O MOMENTO DE DIPLO (M) DA MOLECULA

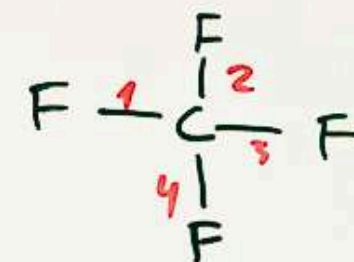
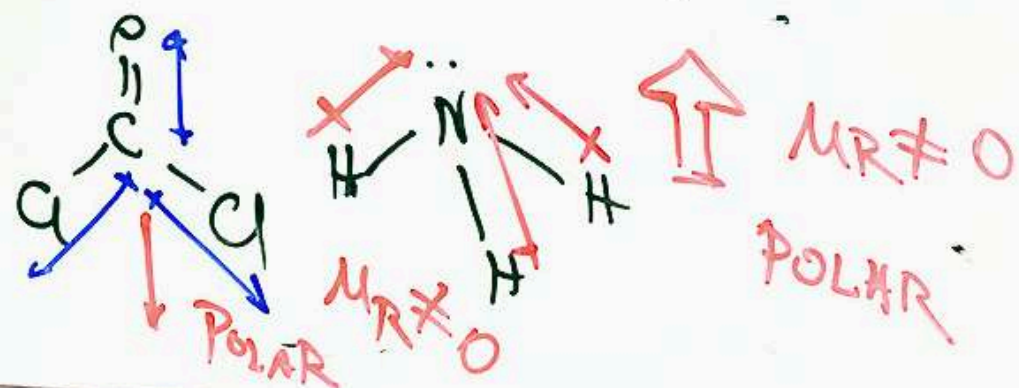
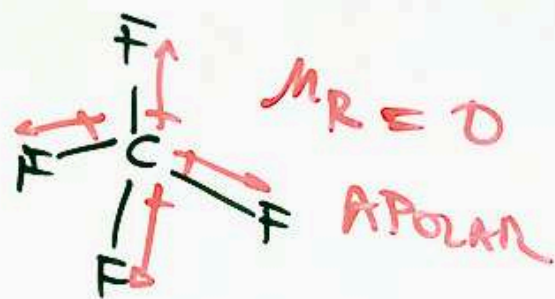
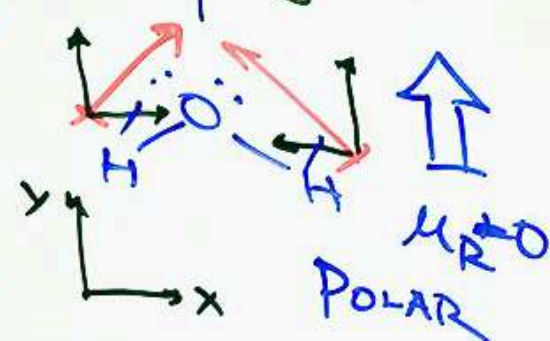
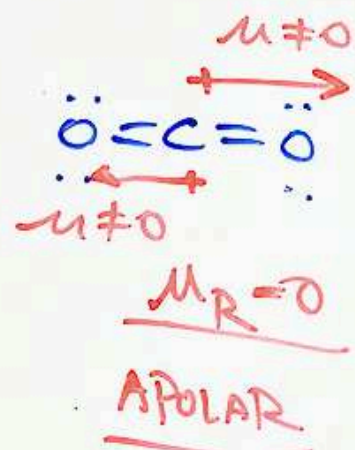
FUI ONTEM
NO CLUBE
BRASIL
I SO COMIH
PIZZA HUT
TEMPERADA



DIPLO DA LIGACAO

DIFERENCA DE
ELETRONEGATIVIDADE
ENTRE DOIS ATOMO

DIPLO DA MOLECULA { DIPLO DAS LIGACOES
GEOMETRIA MOLECULAR



D.E.: 4
D.L.: 1
D.M.: 3

QUANTOS D.E.: 4
QUANTOS D.L.: 0
QUANTOS D.M.: 4

N: D.E.

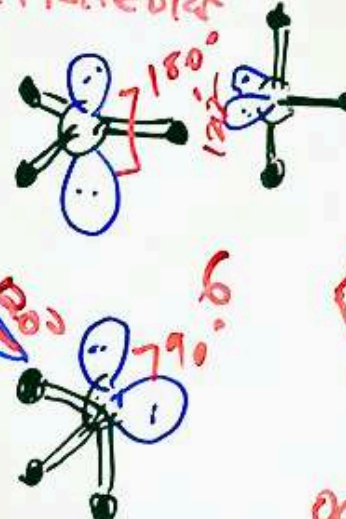
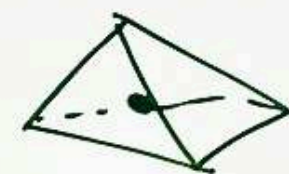
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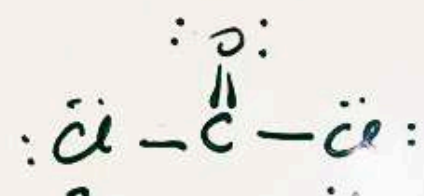


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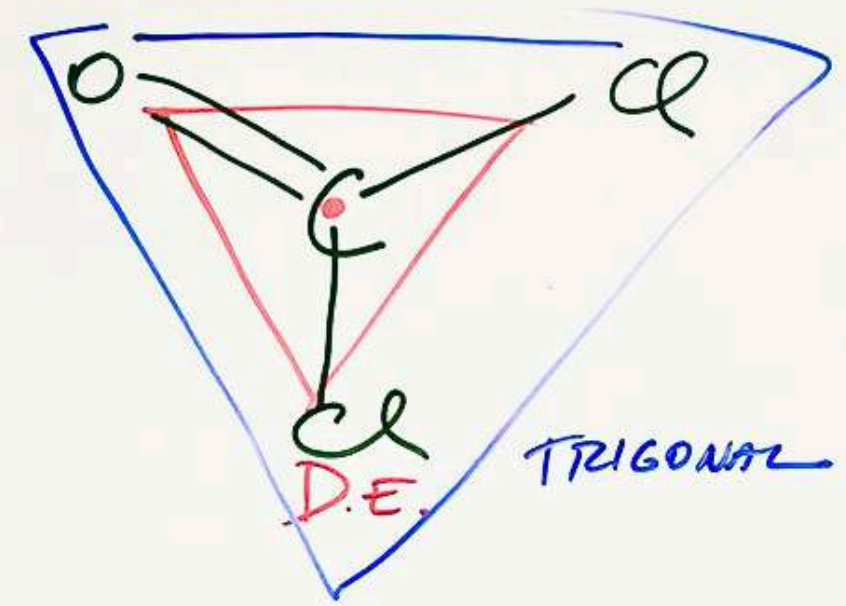


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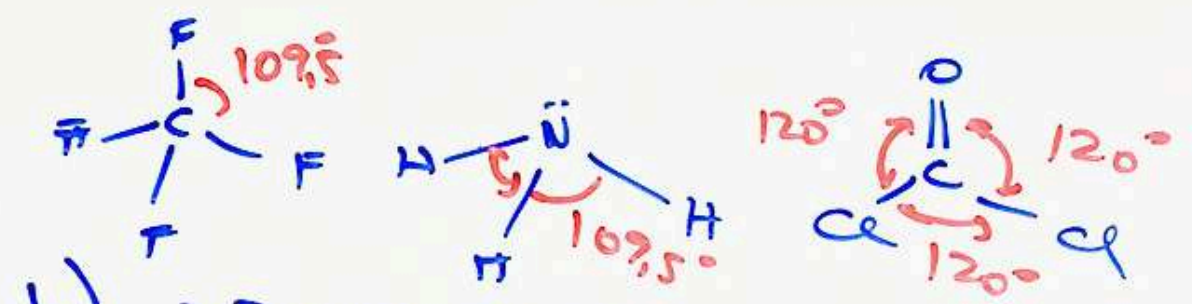


D.E.: 3
D.L.: 0
D.M.: 3

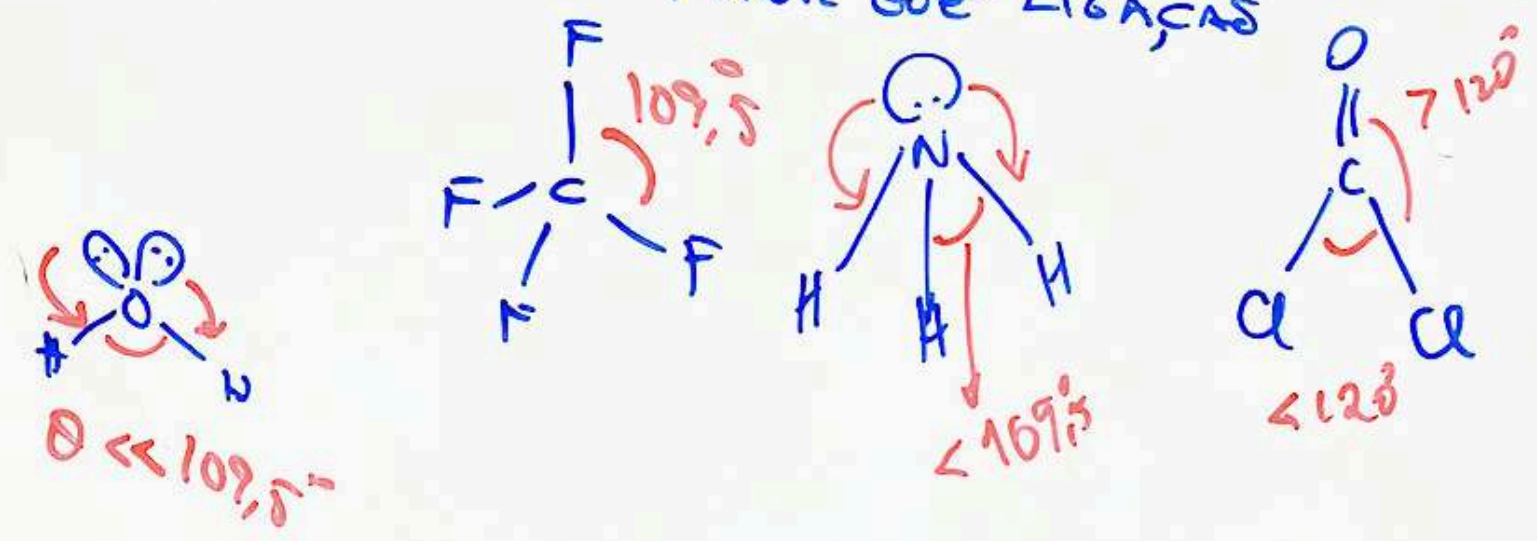


4) CALCULE OS ÂNGULOS DE LIGAÇÃO

a) FORMA DO DOMÍNIO ELETRÔNICO



b) REPULSÃO DE PADES MAIOR QUE DE LIGAÇÕES



GEOMETRIA MOLECULAR

5) DETERMINE O MOMENTO DE DIPLO (M) DA MOLECULA

FUI ONTEM
NO CLUB
BRASIL

I SO COMI
PIZZA HUT
TEMPERADA

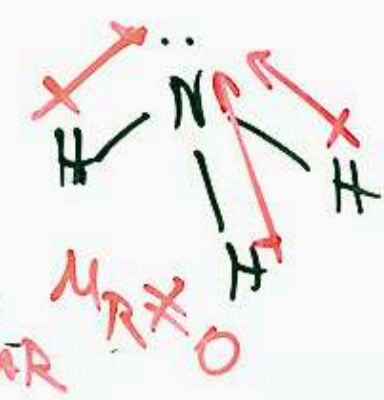
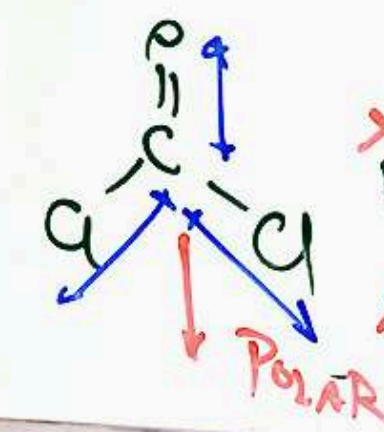
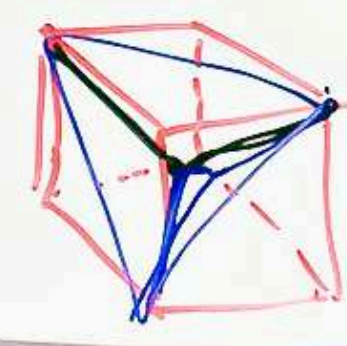
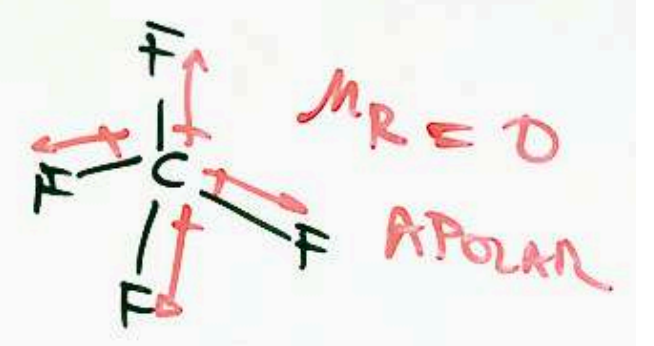
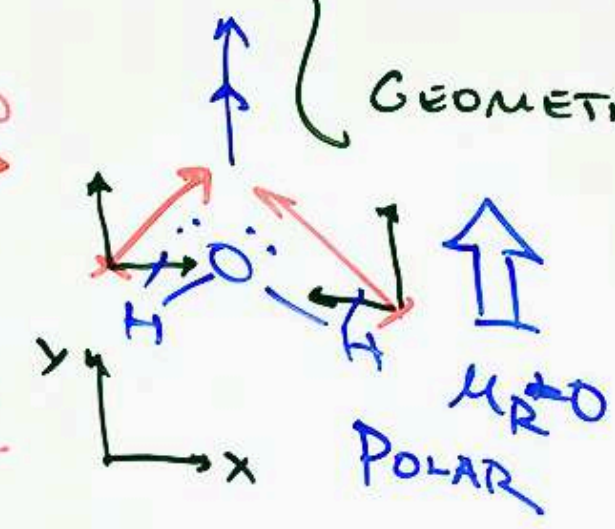
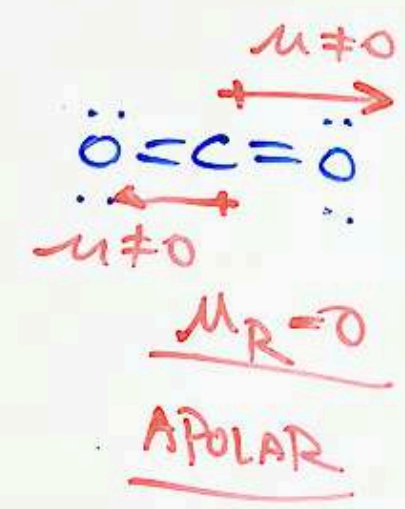
$\mu \neq 0$
 $\Delta \chi$
POLAR

DIPLO DA LIGAÇÃO

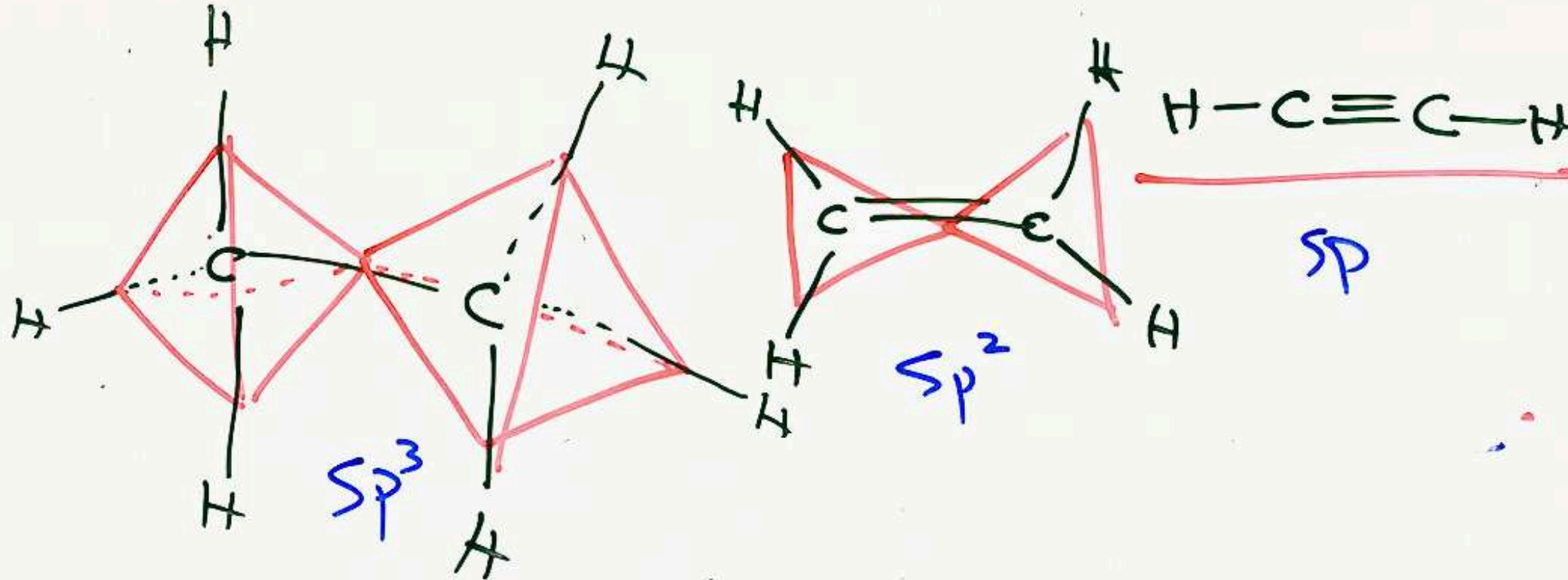
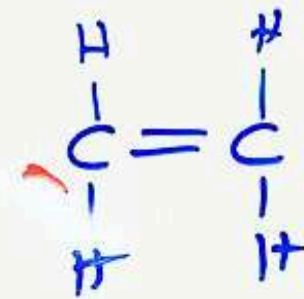
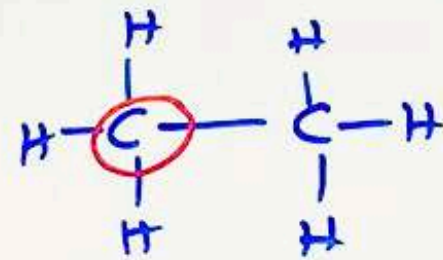
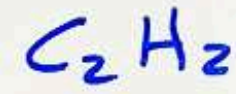
DIFERENÇA DE
ELETRONEGATIVIDADE
ENTRE DOIS ÁTOMO
DIPLO DAS LIGAÇÕES

DIPLO DA MOLECULA

GEOMETRIA MOLECULAR



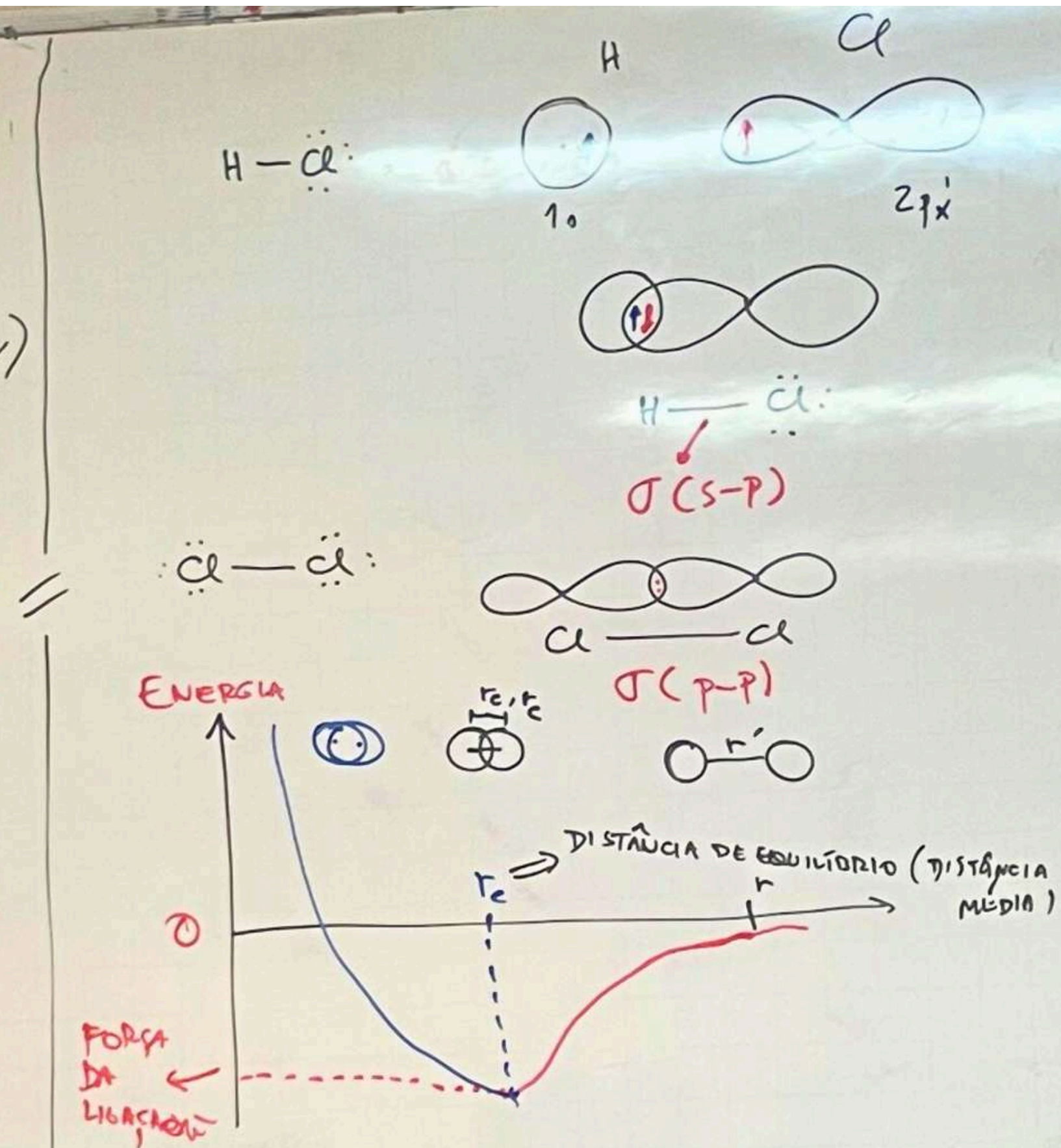
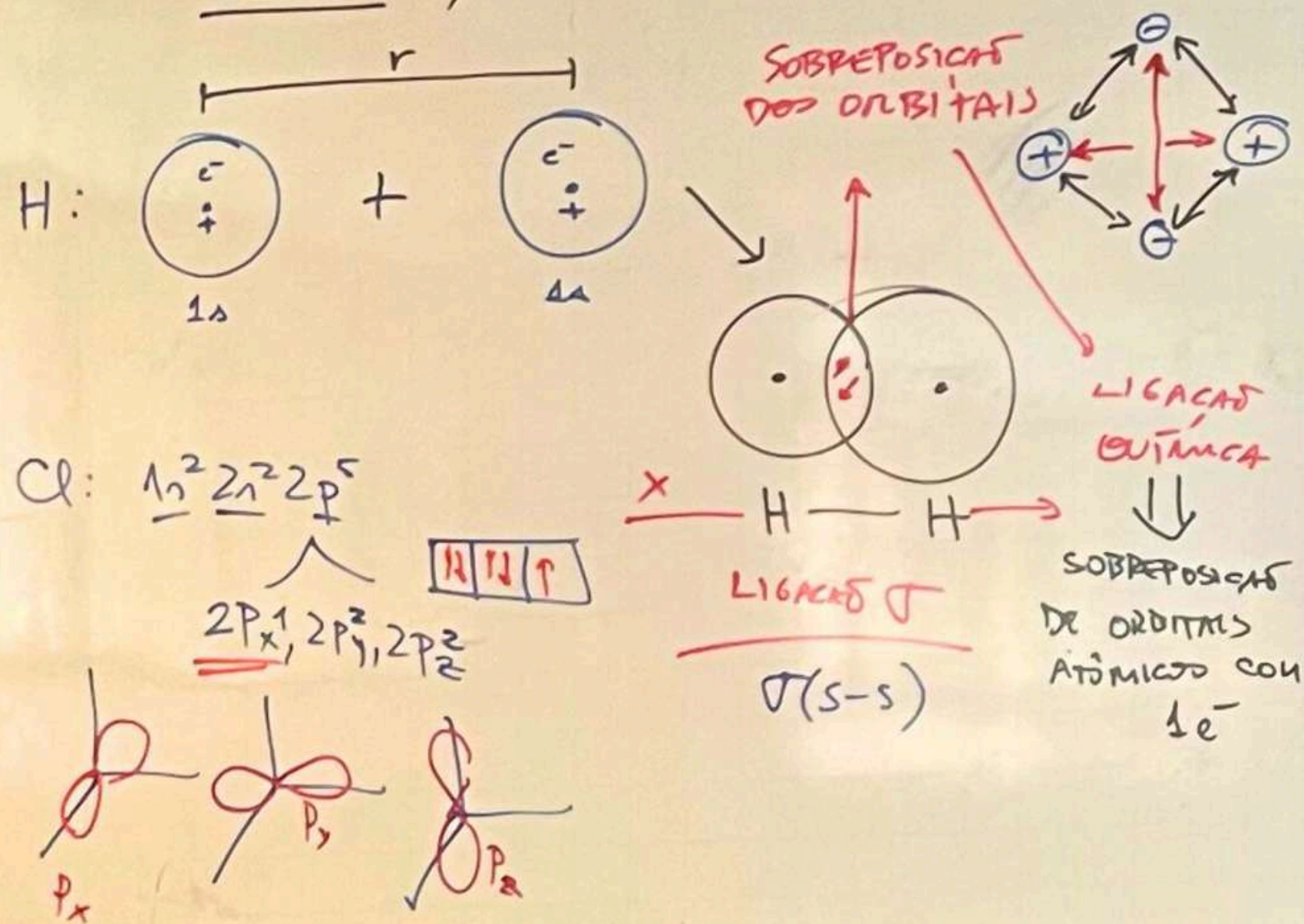
6) MAIS DE UM CENTRAL



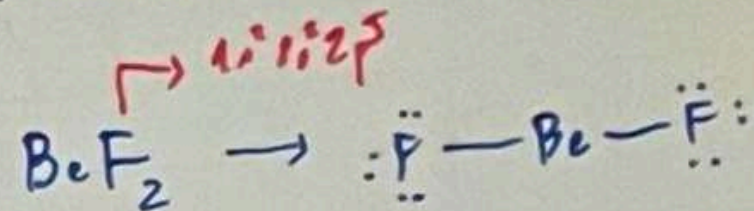
Turma MT

* PAPEL DOS ORBITAIS NA GEOMETRIA MOLECULAR

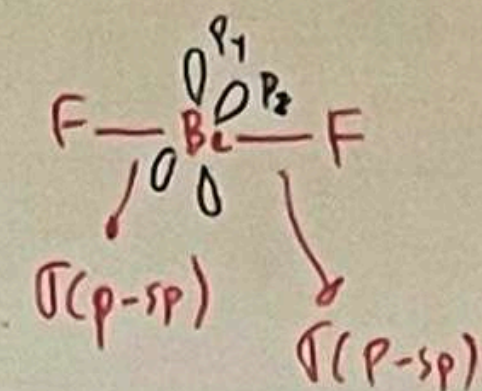
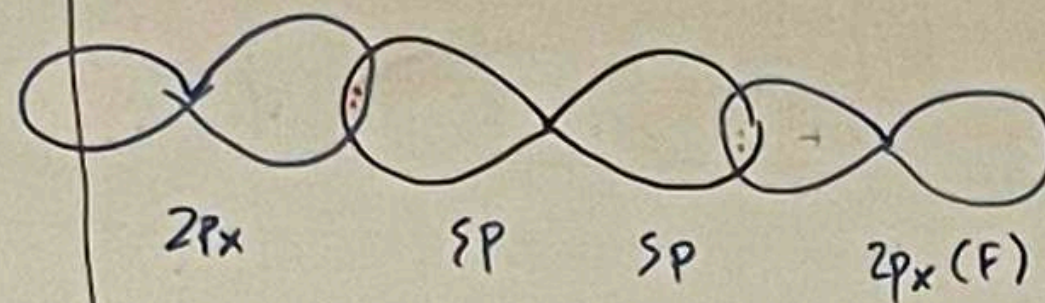
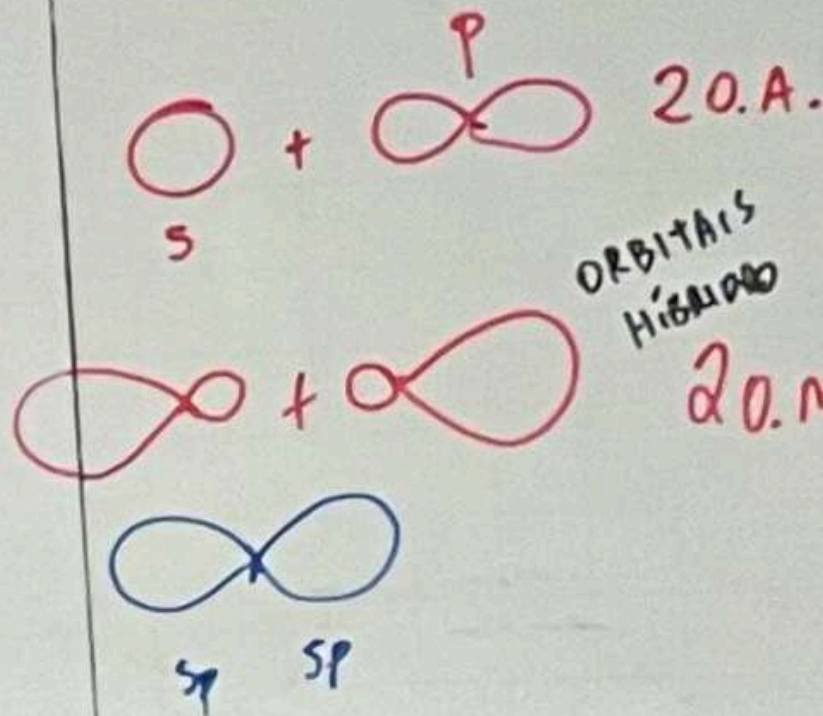
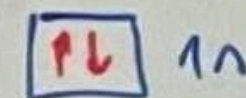
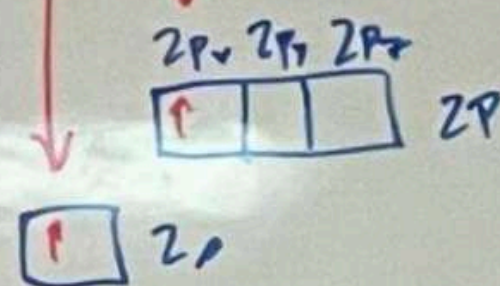
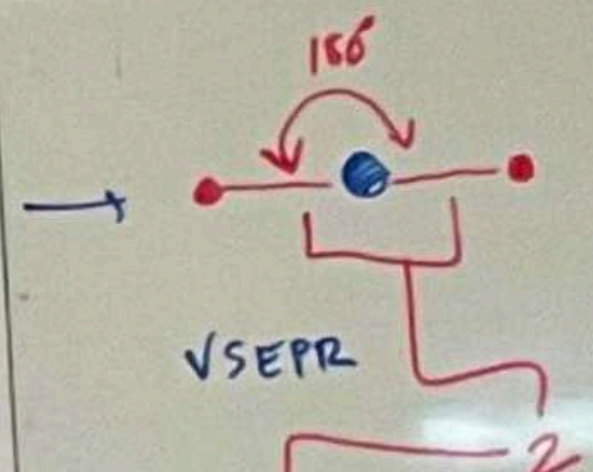
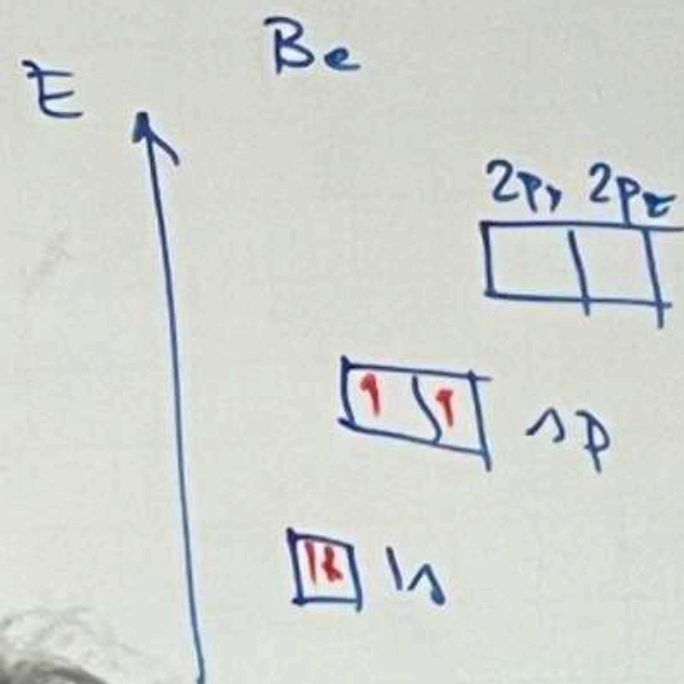
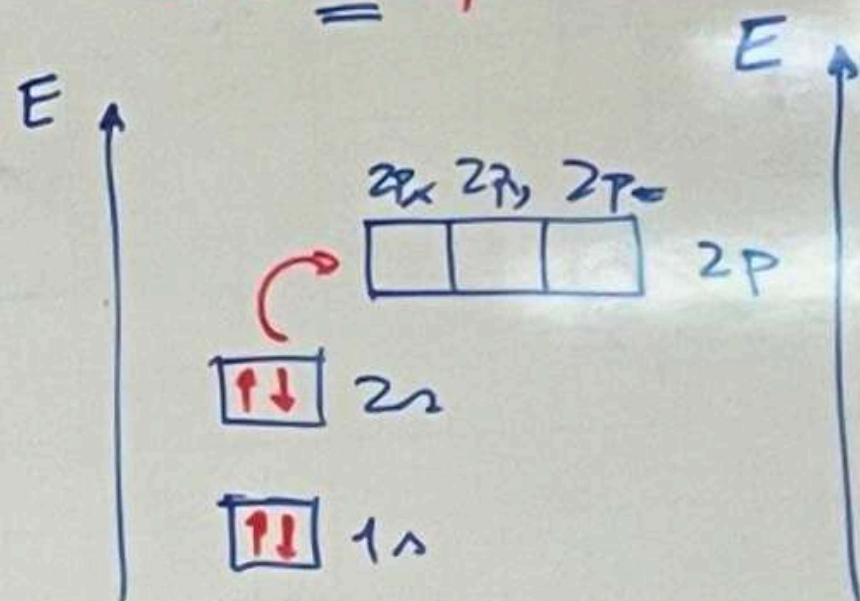
VSEPR, TEORIA DE LIGAÇÃO DA VALENÇA (TLV)



* ORBITAIS HÍBRIDOS



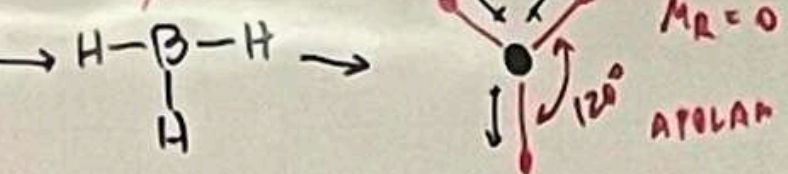
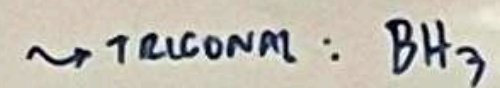
Lewis $1s^2 2s^2 2p^0$



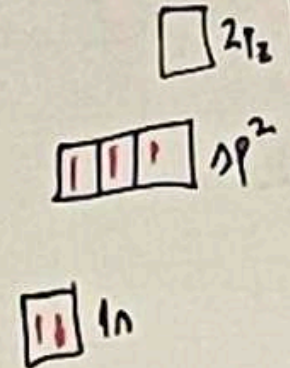
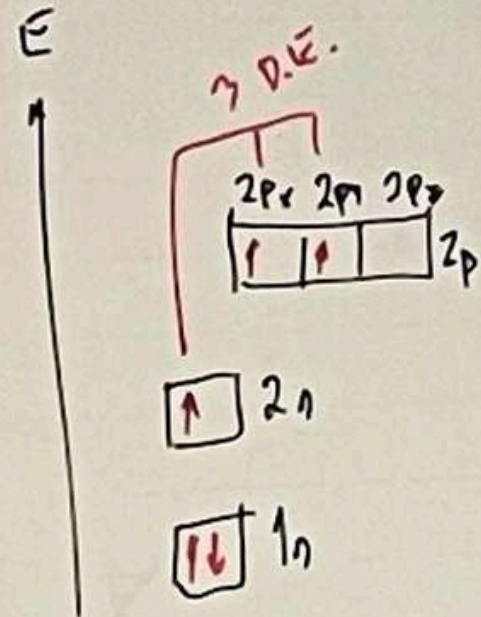
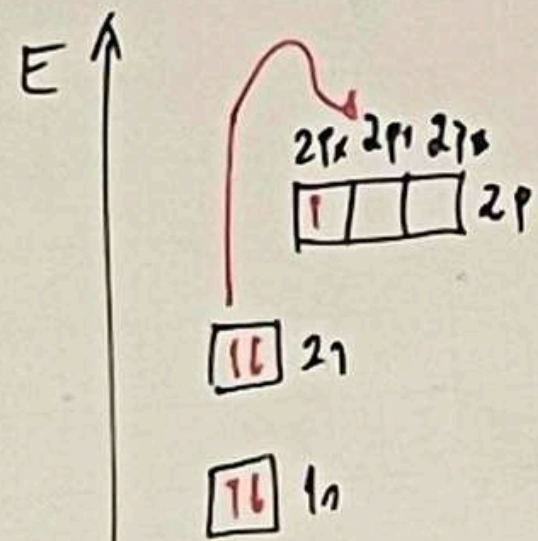
• ENTENDEGE GEOMETRIAS:

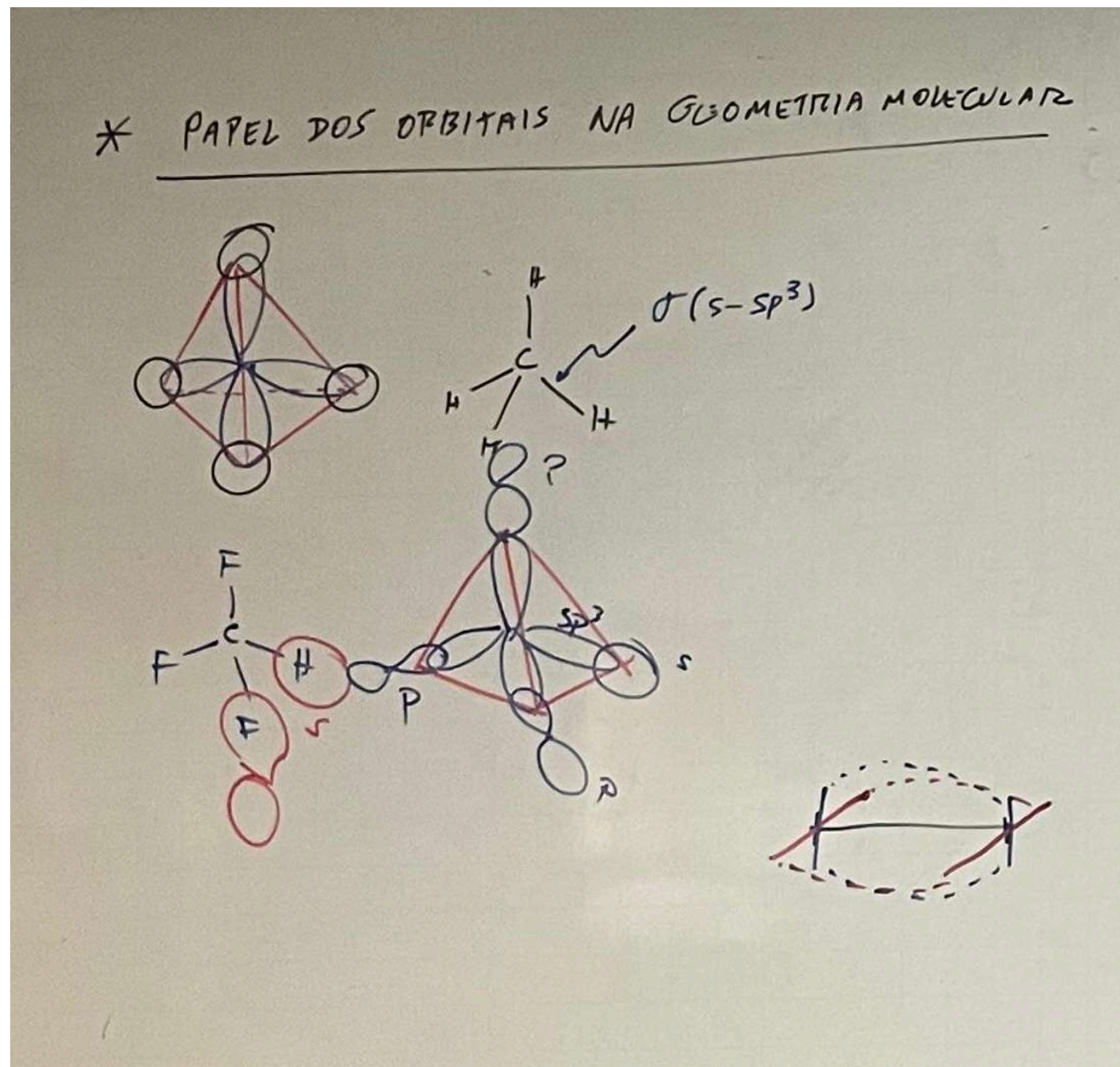
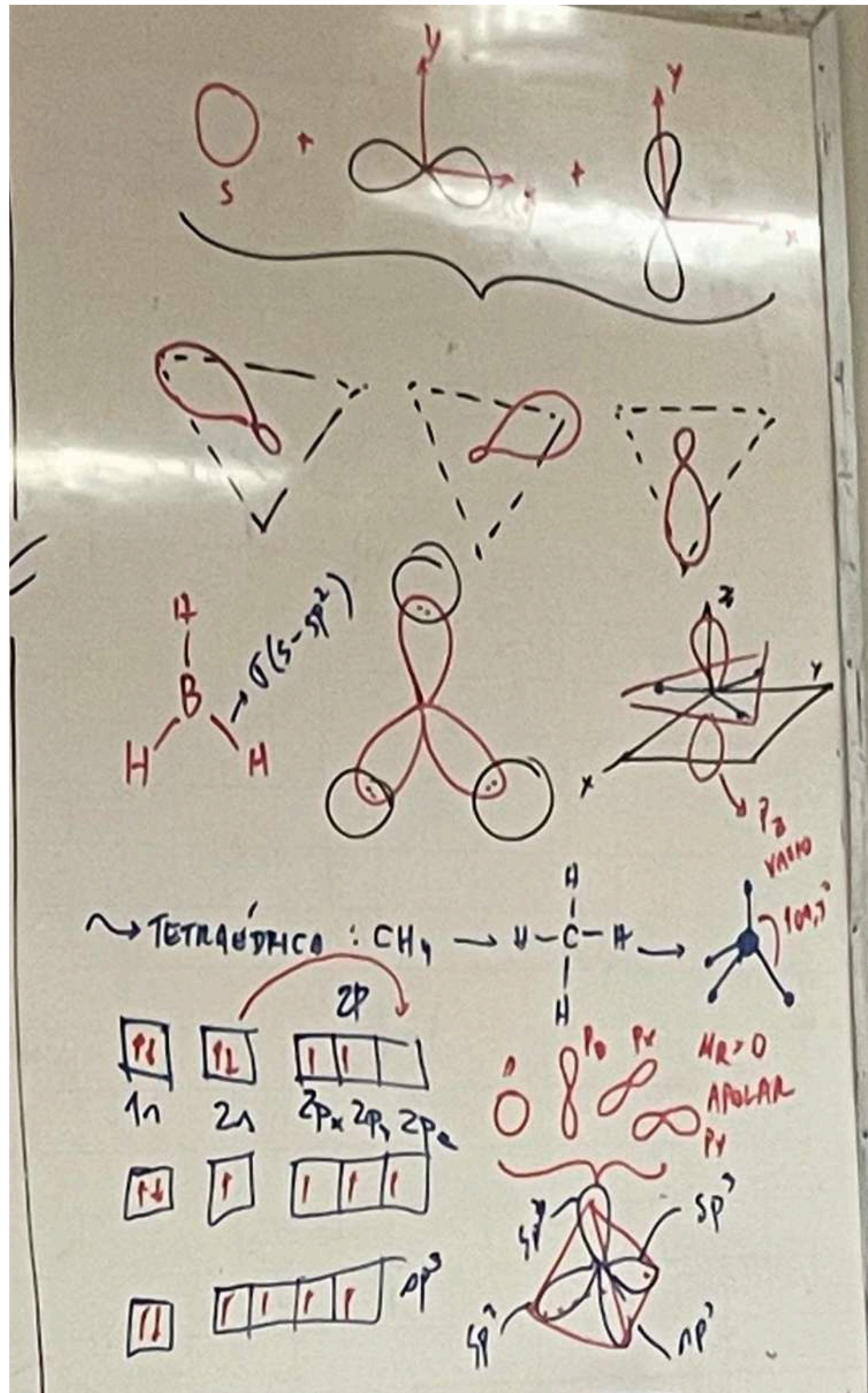
- TRIGONAL

- TETRAÉDRICA



B: $1s^2 2s^2 2p^1$



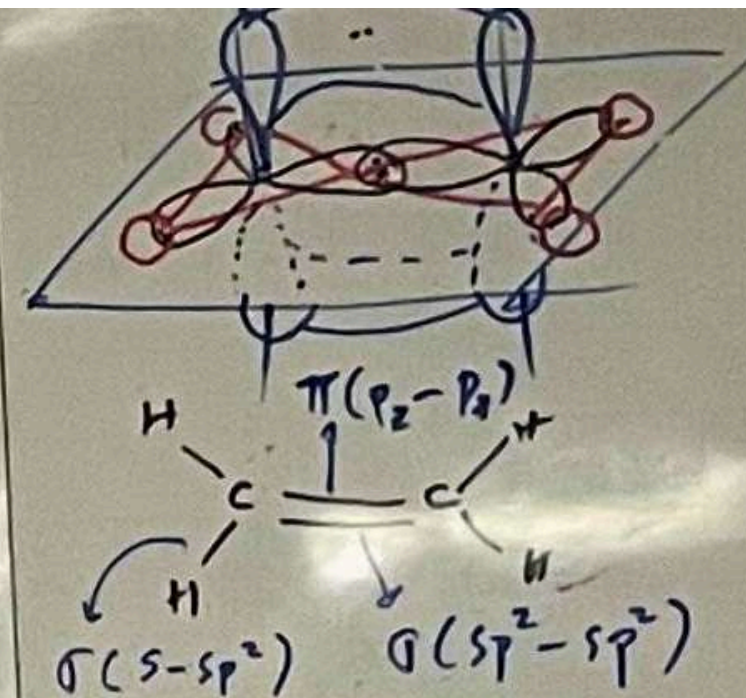
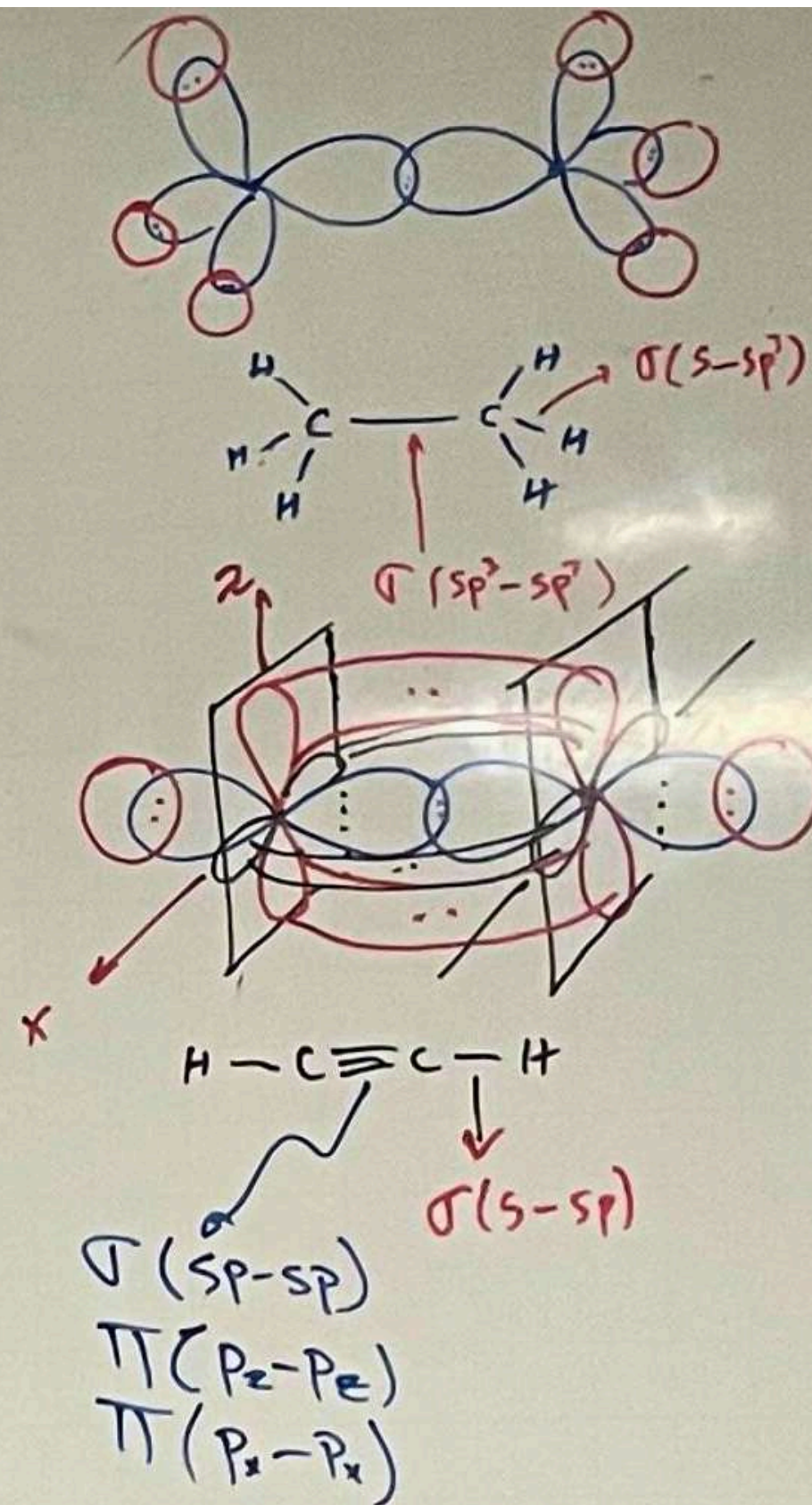
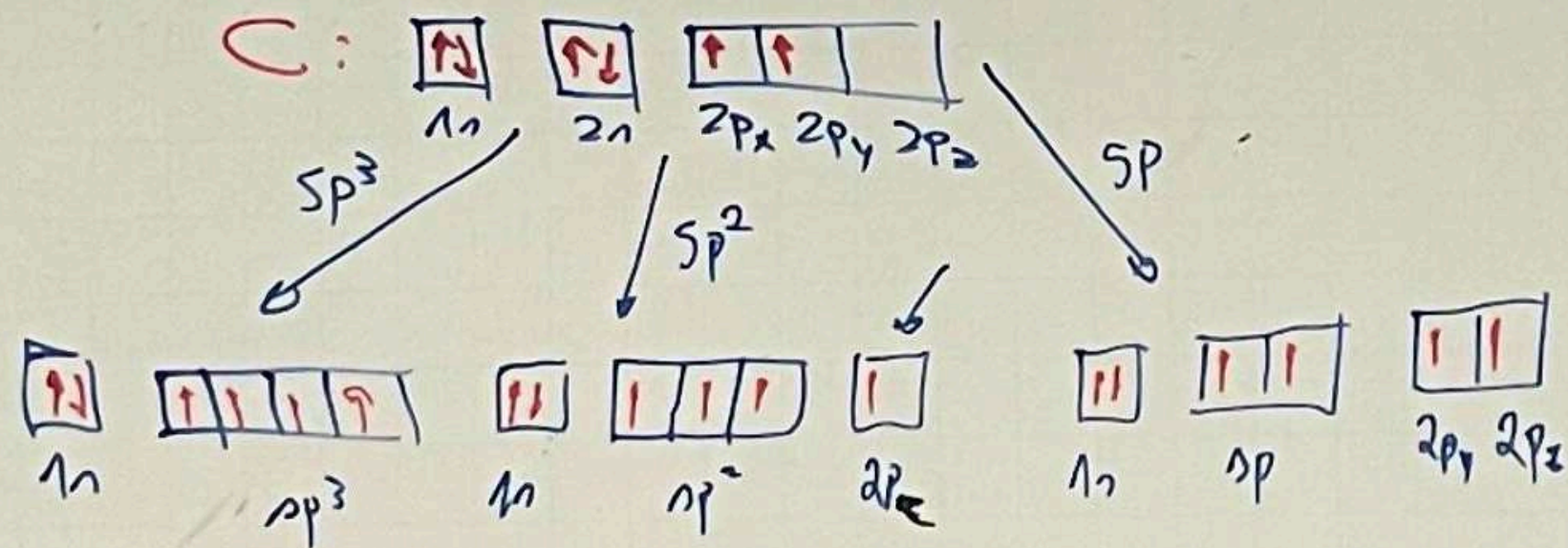
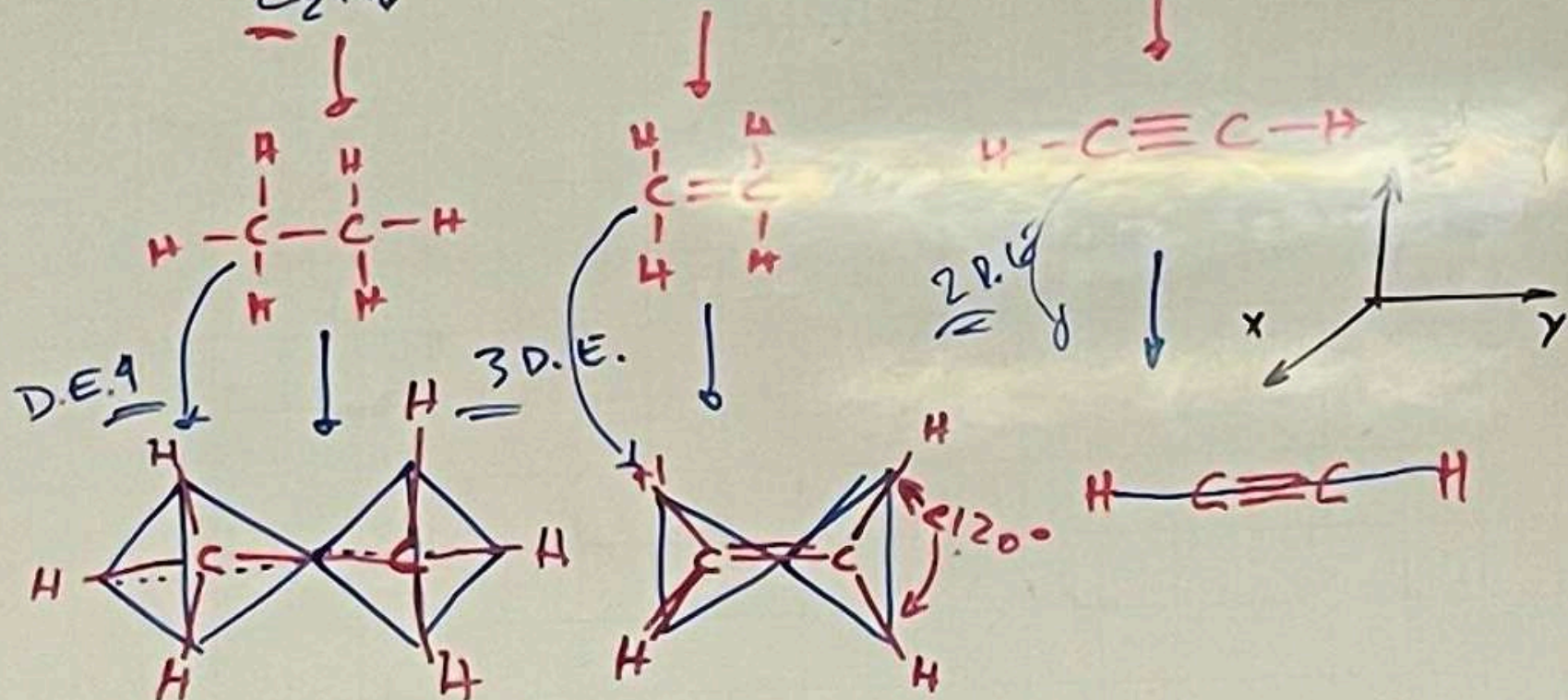


* LIGAÇÕES MÚLTIPLAS

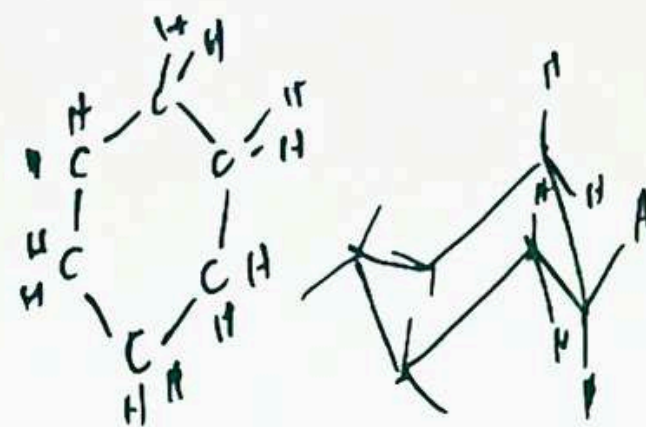
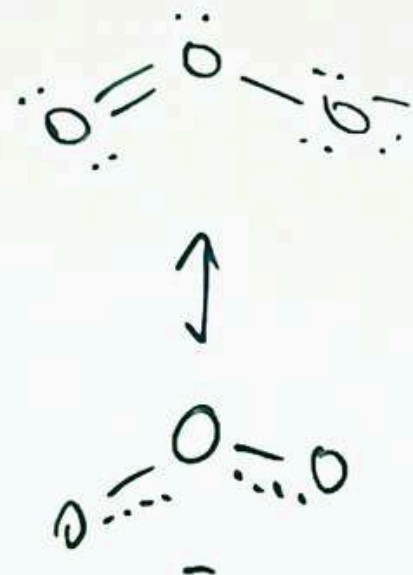
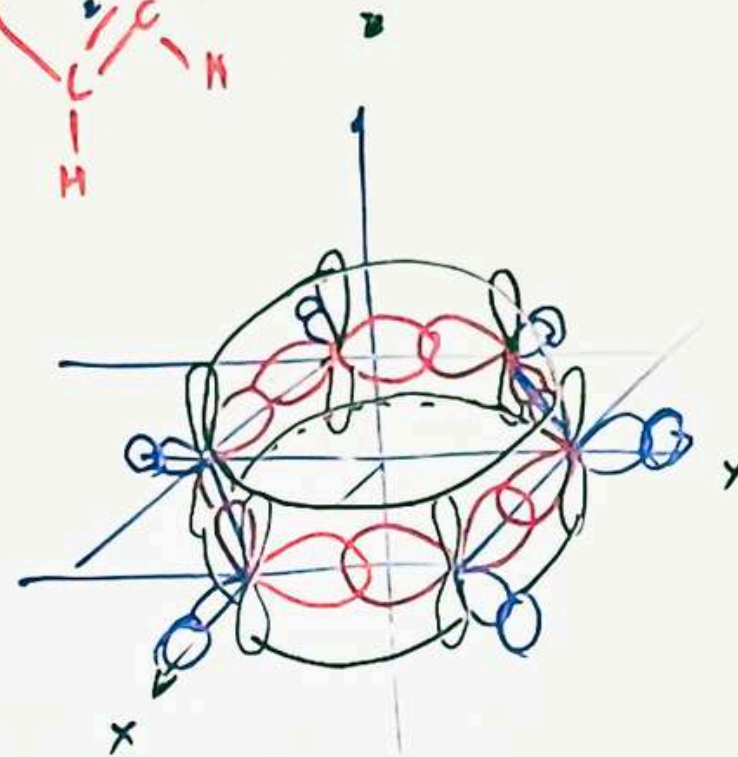
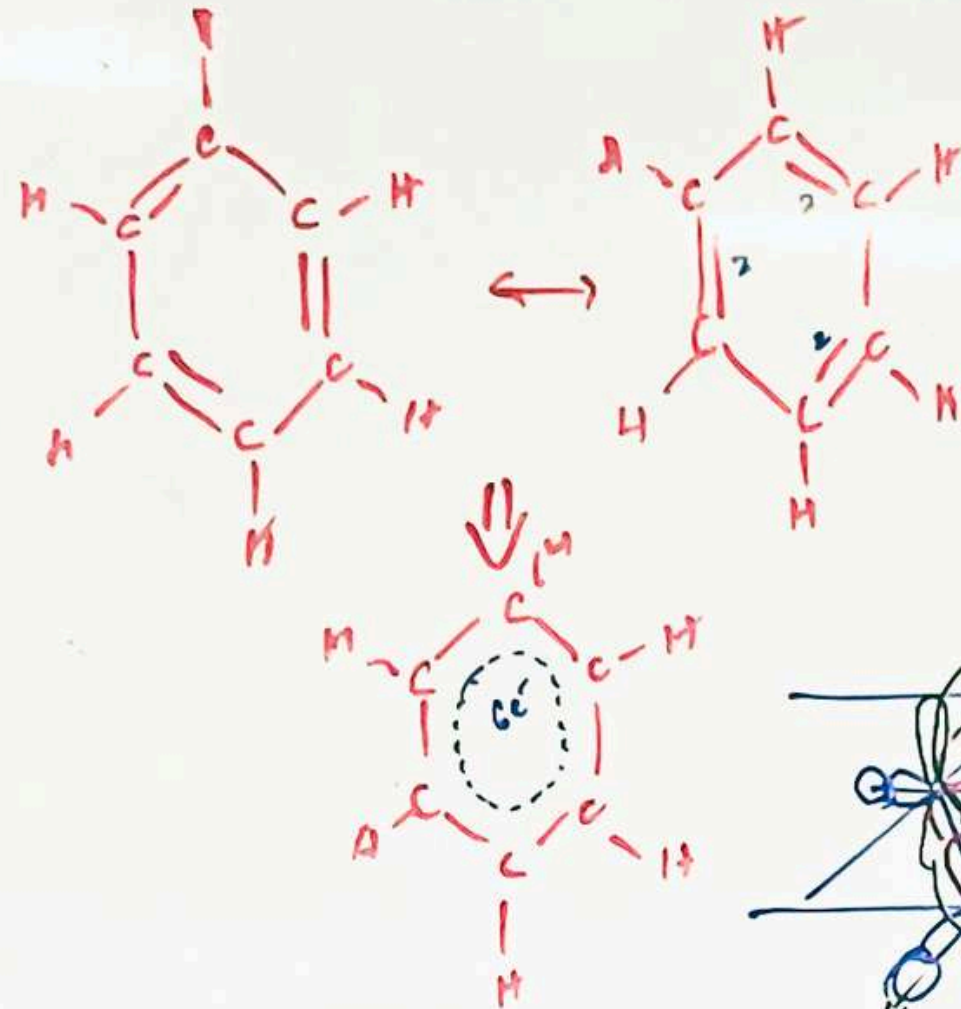
ETANO
 C_2H_6

ETENO
 C_2H_4

ETINO
 C_2H_2



* RESSONÂNCIA \Rightarrow DESLOCALIZAÇÃO DE e^- EM LIGAÇÕES π



Turma PM

* RELAÇÃO ENTRE LIGAÇÃO QUÍMICA, GEOMETRIA E ORBITAIS

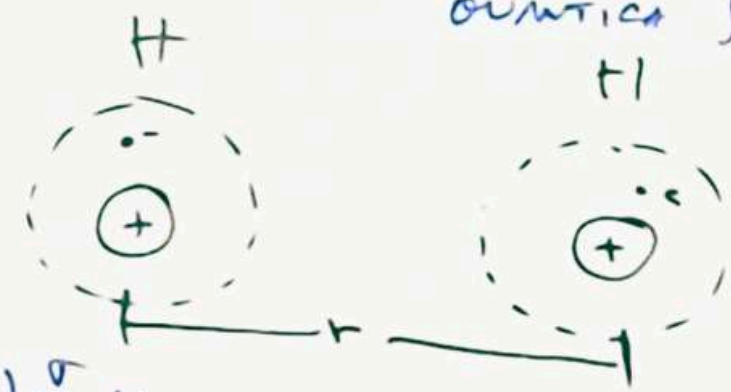
- O QUE SÃO LIGAÇÕES QUÍMICAS E COMO SE FORMAM
- TEORIA DE LIGAÇÃO DA VALENÇA (TLV)

MECÂNICA QUÂNTICA

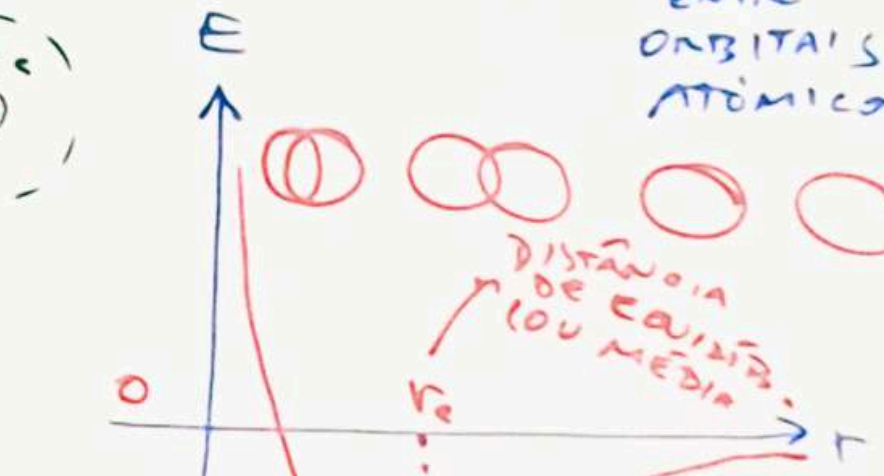
LIGAÇÃO QUÍMICA

ORBITAIS DAS MOLÉCULAS

INTERAÇÃO ENTRE ORBITAIS ATÔMICOS



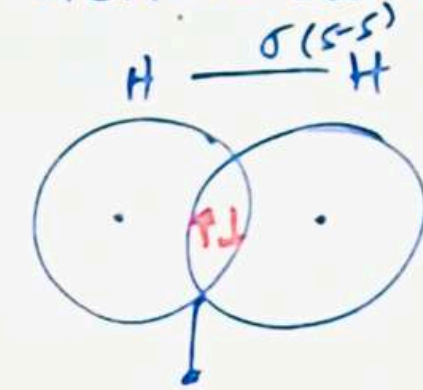
LIGAÇÃO FORMADA PELO SOBREPÓSICÃO DO EIXO DA LIG.



ENERGIA (FORÇA) DA LIGAÇÃO

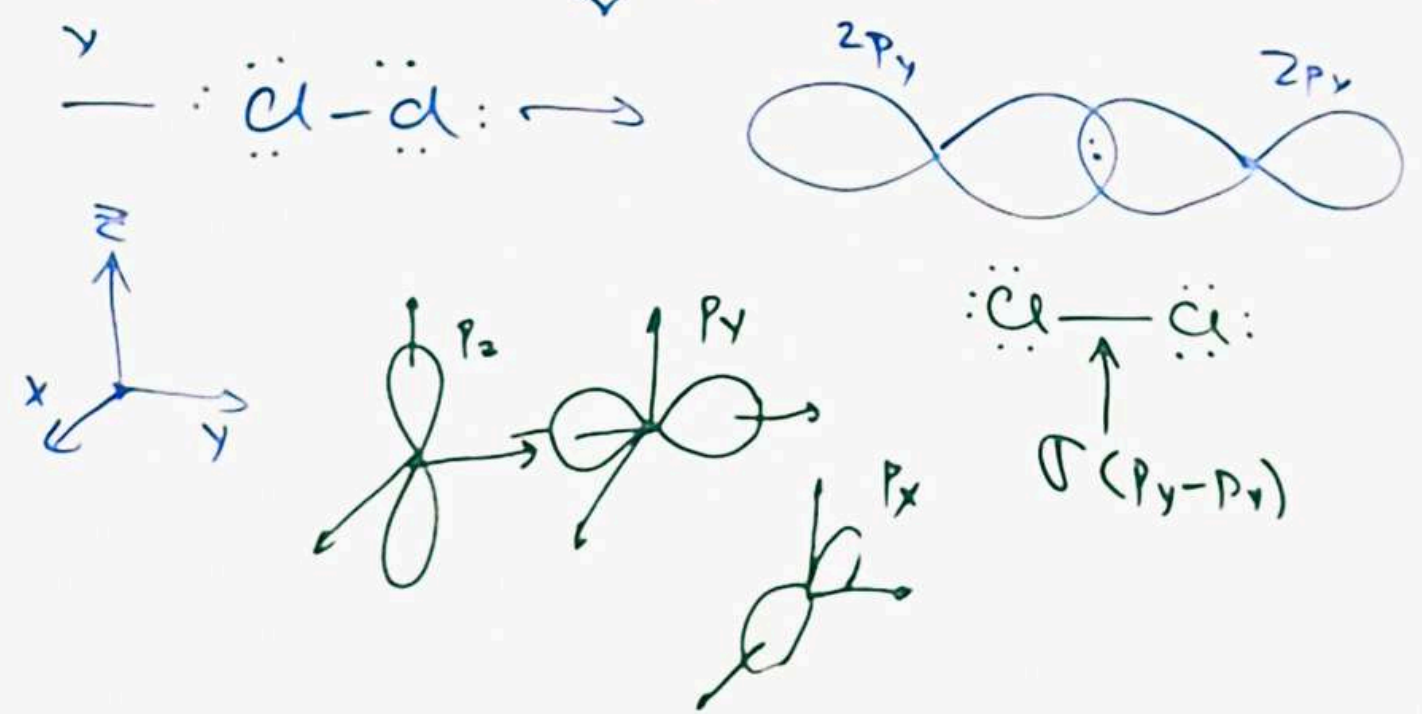
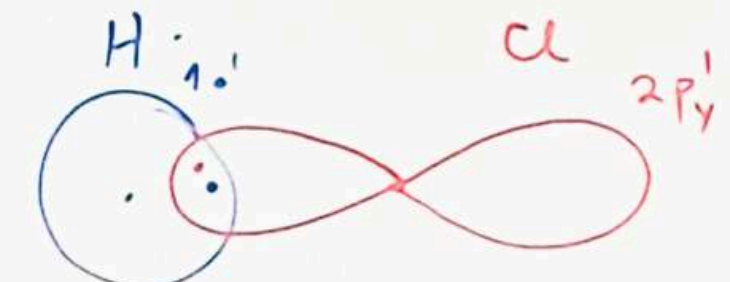
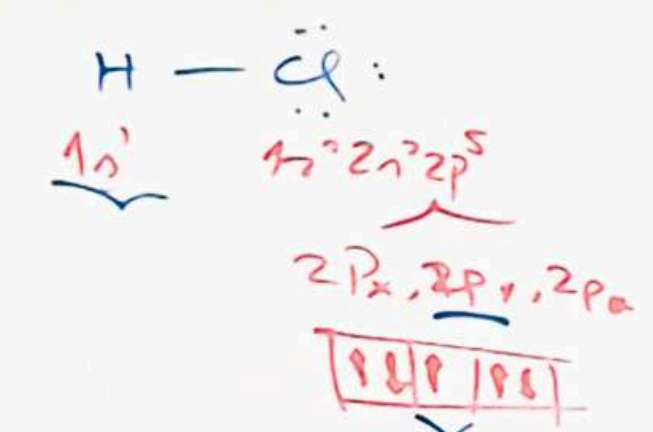
FORÇAS ATRATIVAS E REPULSIVAS

LIGAÇÃO OCORRE ENTRE ORBITAIS COM UM ELÉTRON

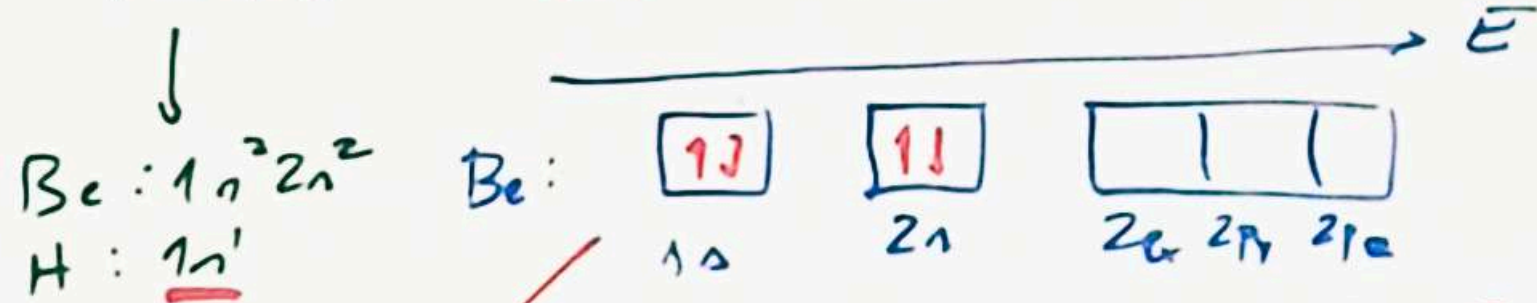
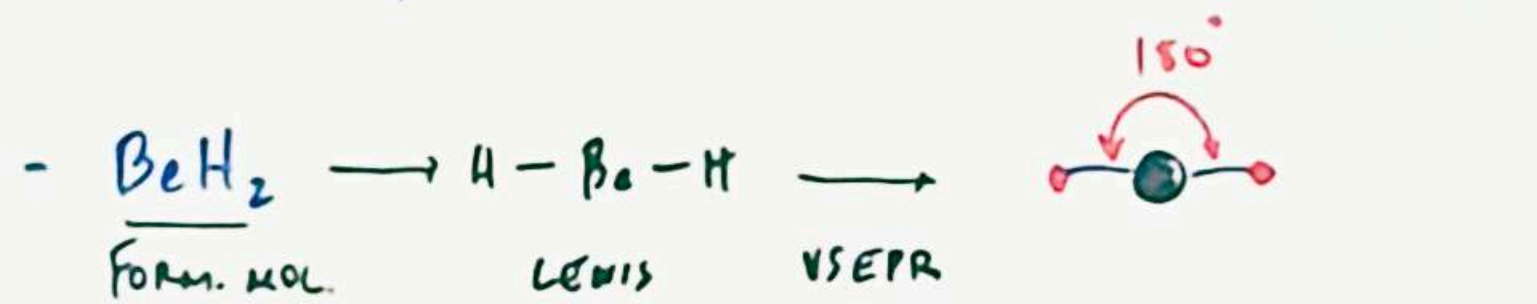


COMBINAR ORBITAIS DE $1e^-$
LIGAÇÃO

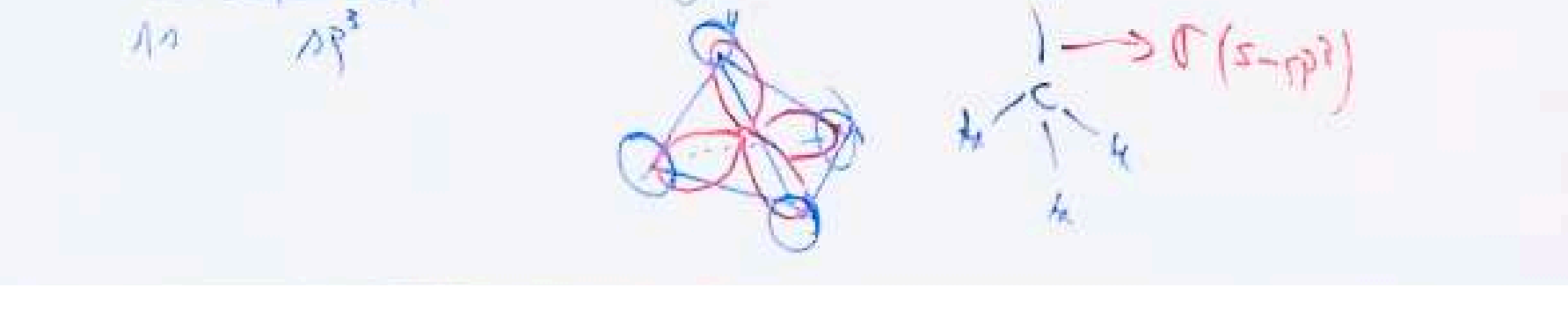
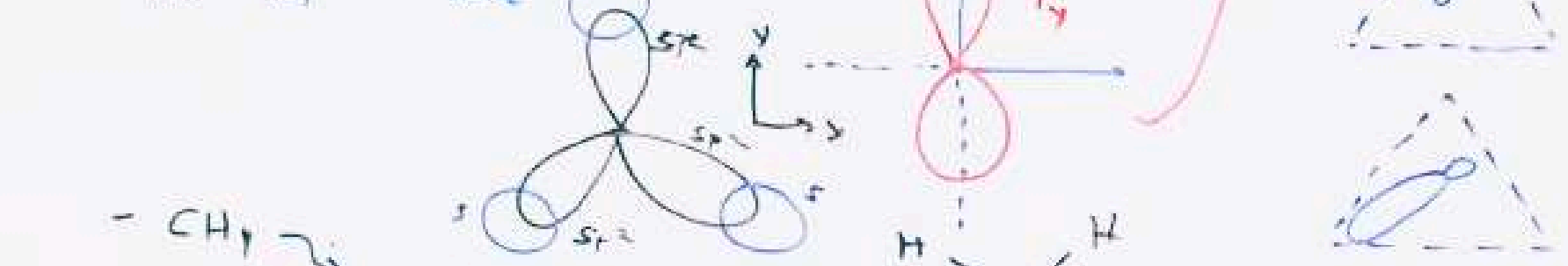
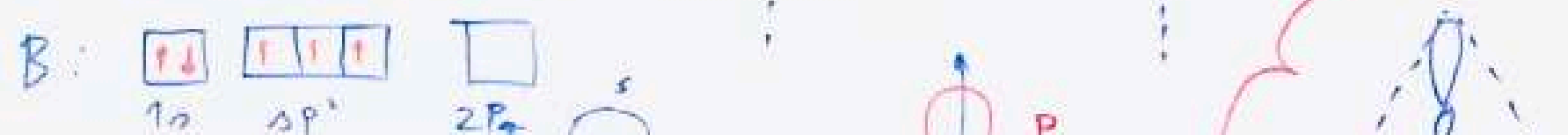
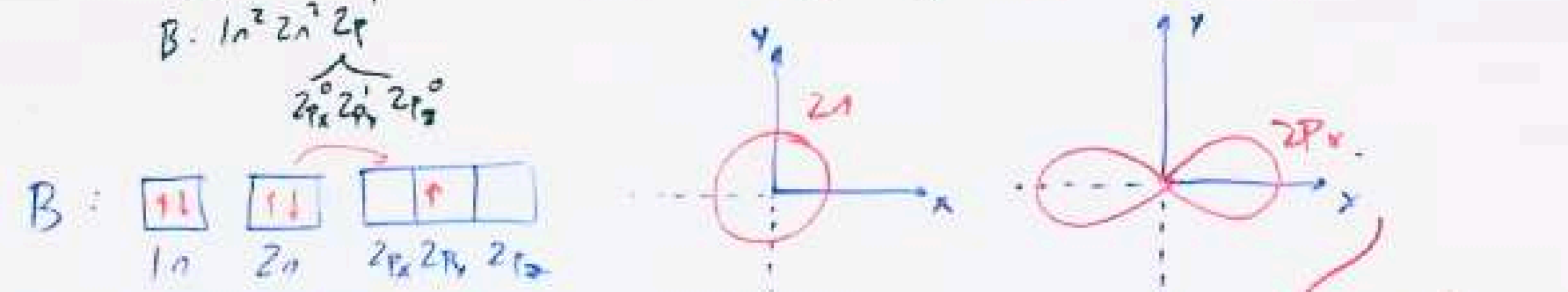
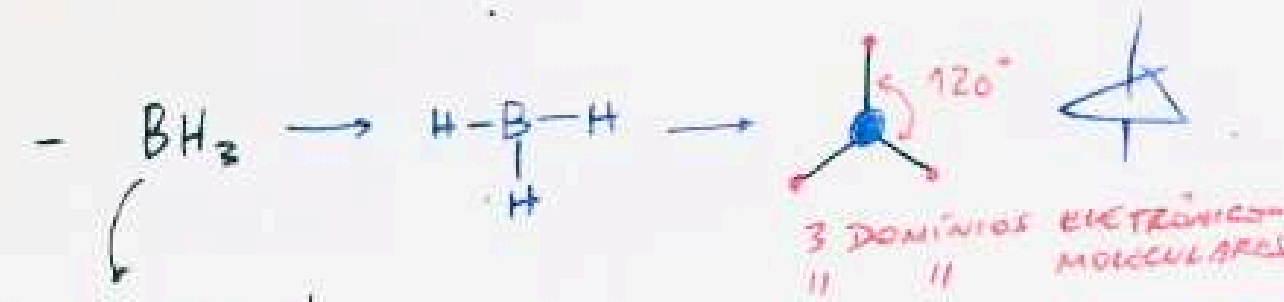
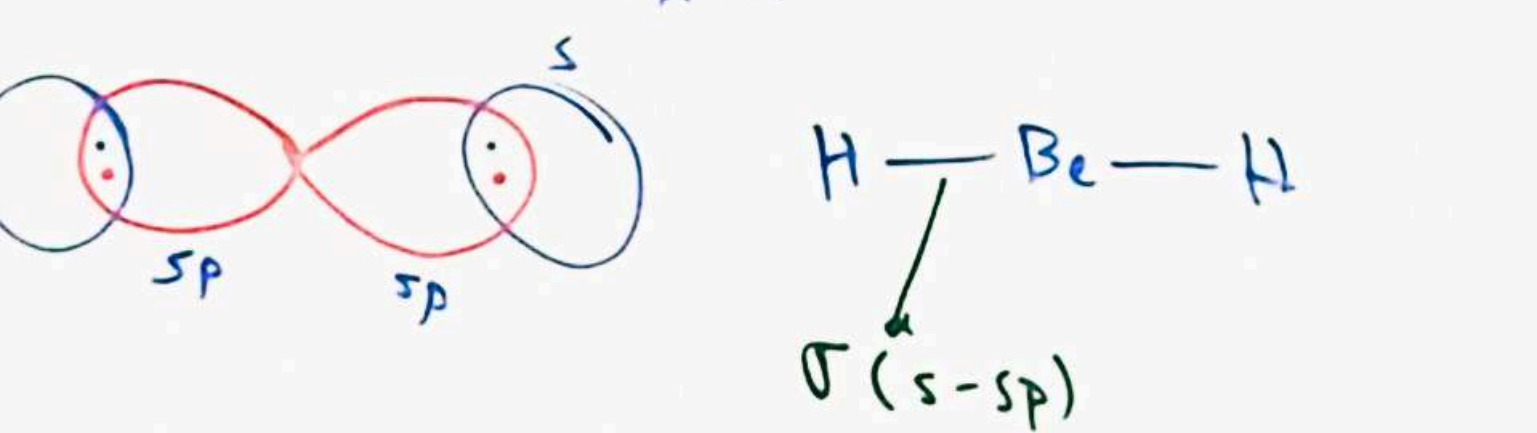
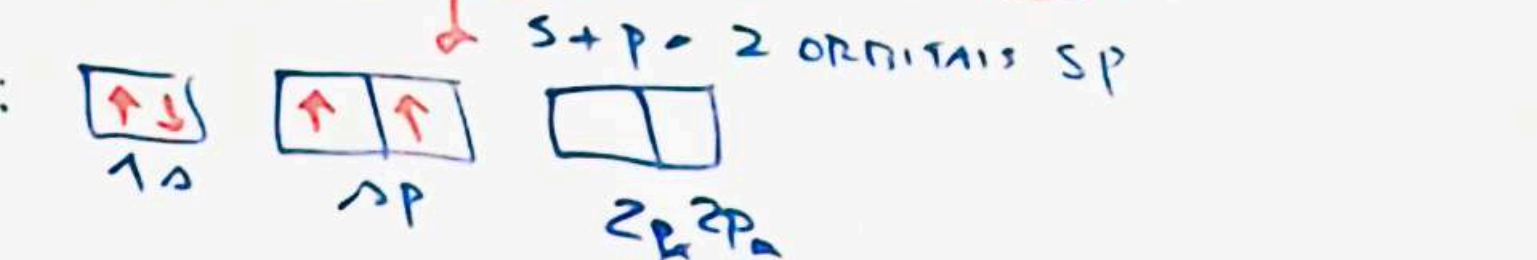
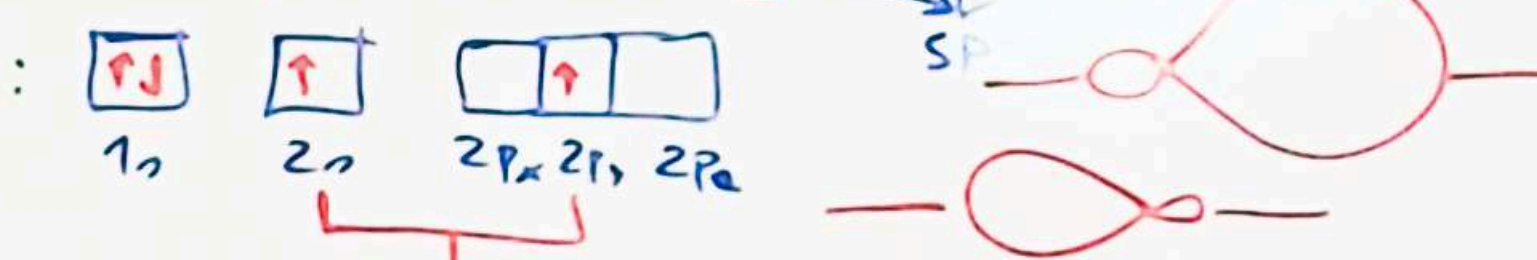
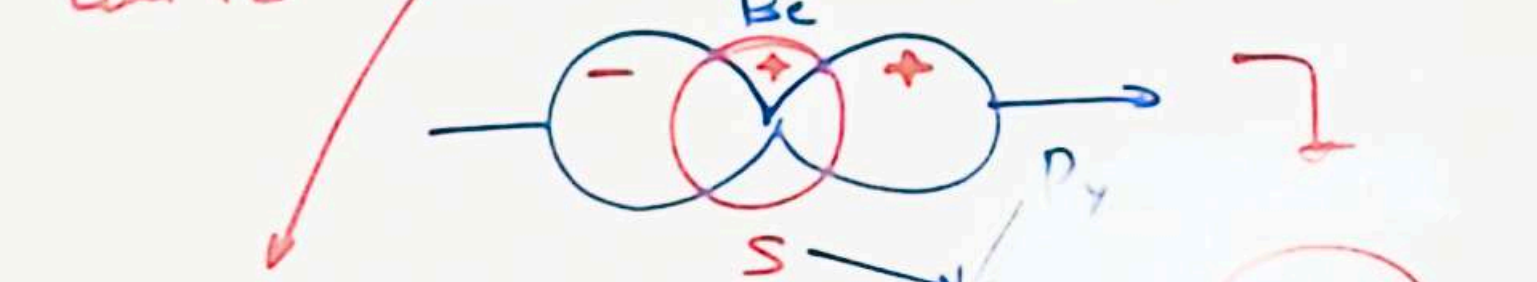
ORBITAL MOLECULAR } SO CABA COM SPINS OPOSTOS



• HIBRIDIZAÇÃO

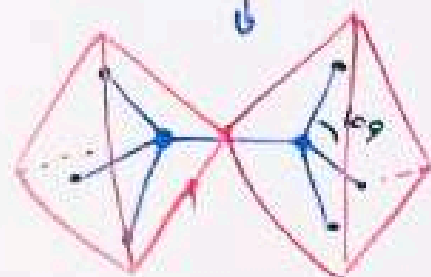
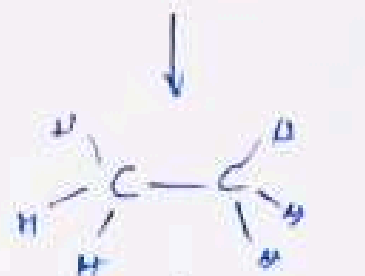


2 DOMÍNIOS ELET. \Rightarrow 2 ORBITAIS DE $4e^-$



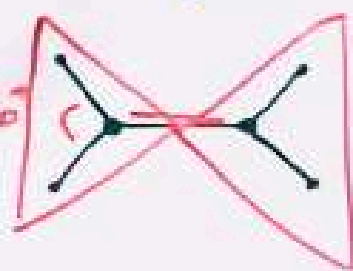
* LIGAÇÕES MÚLTIPLAS

ETANO
 C_2H_6



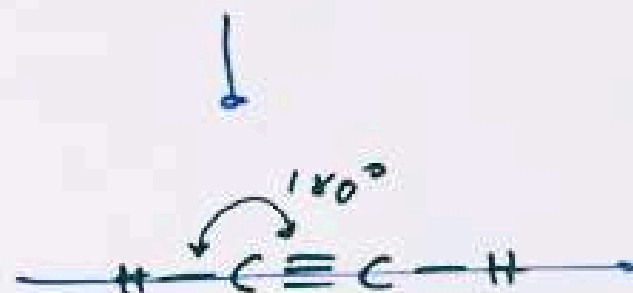
4 D.E. \Rightarrow 4 ORBITAIS HÍBRIDOS

ETENO
 C_2H_4

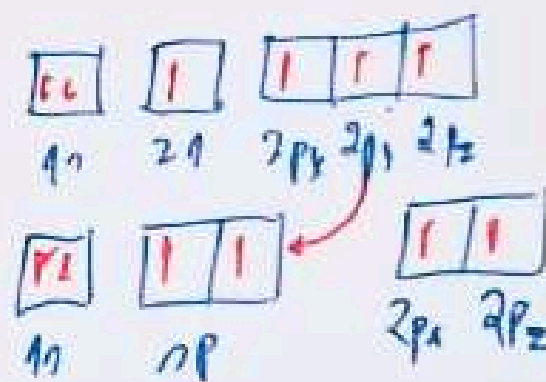
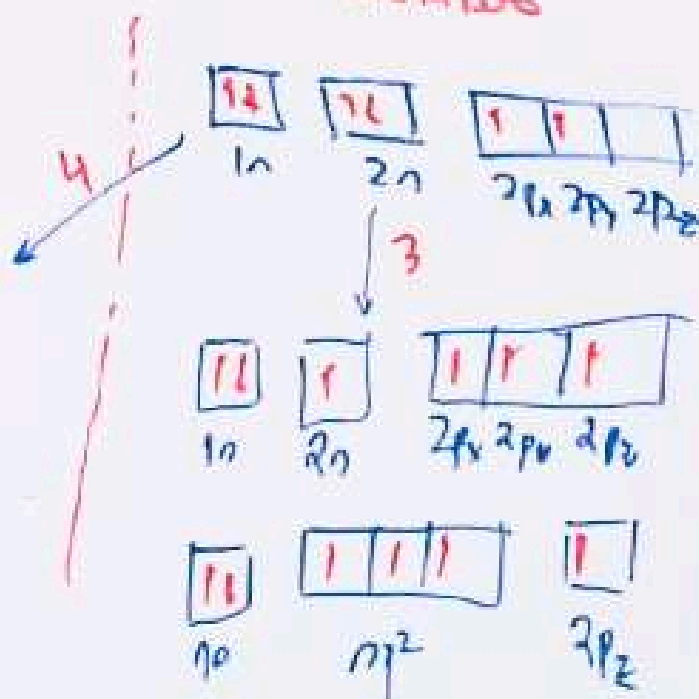


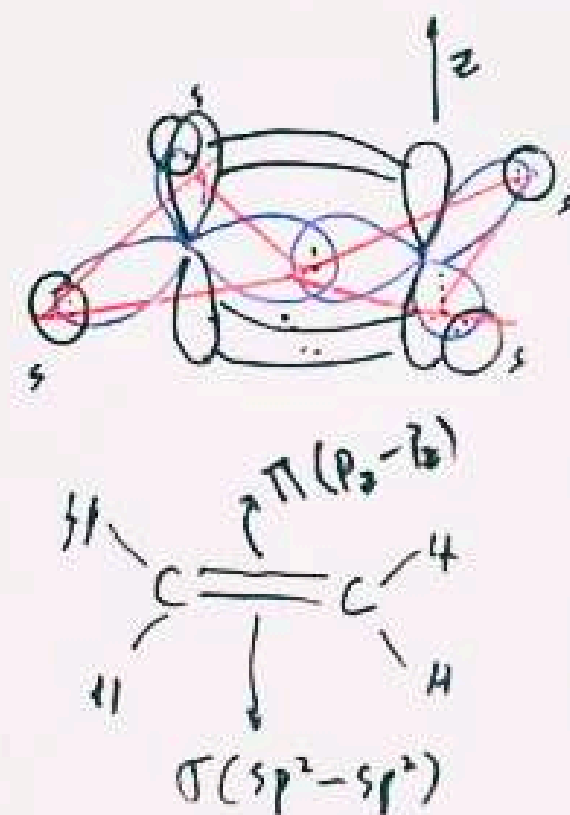
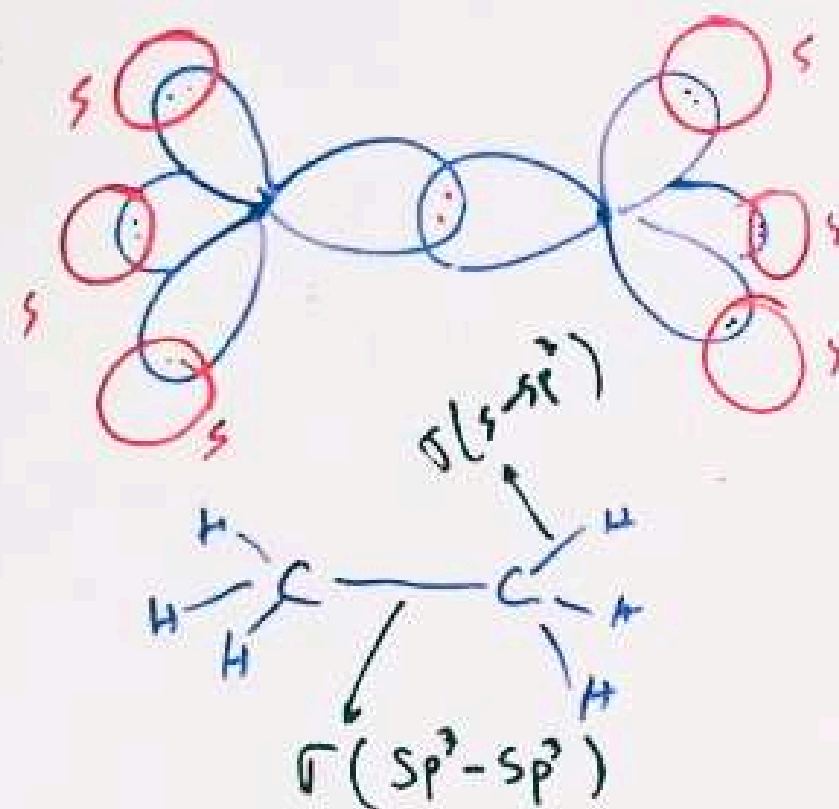
3 D.E. \Rightarrow 3 ORBITAIS HÍBRIDOS

ETINO
 C_2H_2

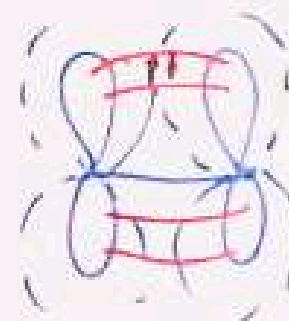


2 D.E. \Rightarrow 2 ORBITAIS

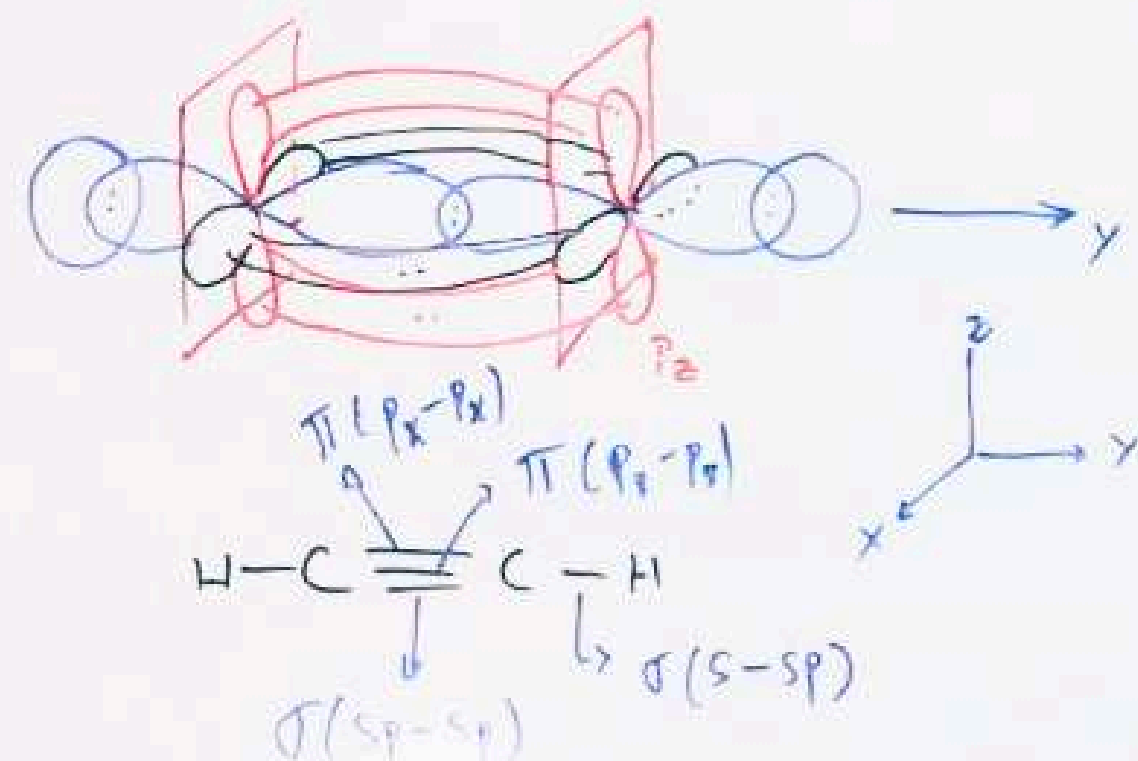




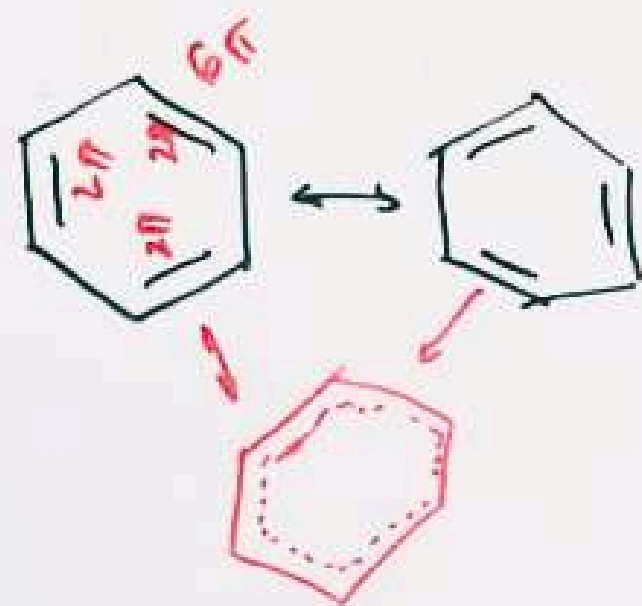
LIGAÇÃO ENTRE
 ORBITAIS DE $1e^-$
 EM EIXOS PARALELOS
 PERPENDICULARES À LIGAÇÃO



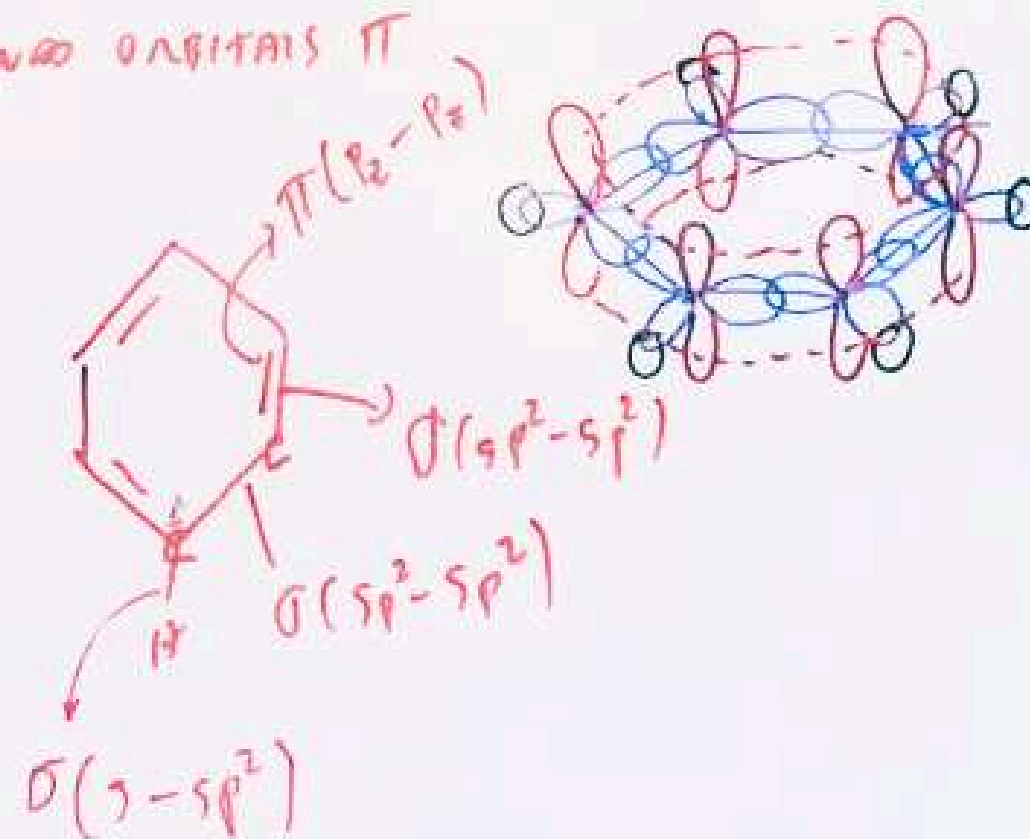
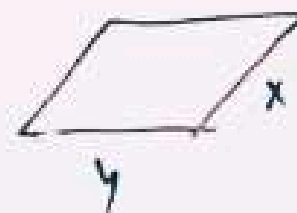
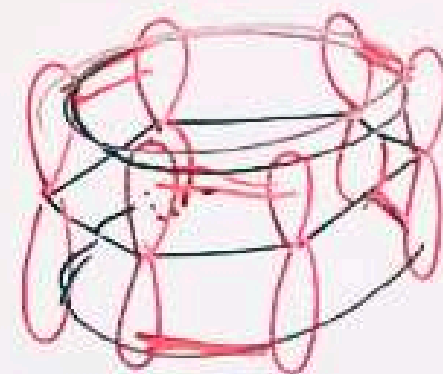
LIGAÇÃO
 π



* RESSONÂNCIA : INTERAÇÃO ENTRE ORBITAIS π DE VÁRIOS ÁTOMOS



DESCO. DOS ELÉTRONS NOS ORBITAIS π



* INTERAÇÕES INTERMOLECULARES

• PROPRIEDADES DE LÍQUIDOS E SÓLIDOS

ENERGIA CINÉTICA: $K \rightarrow$ MOVIMENTO
ENERGIA POTENCIAL: $V \rightarrow$

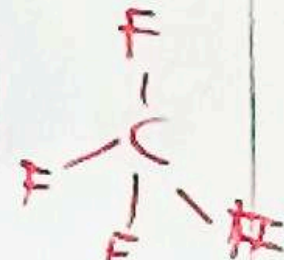
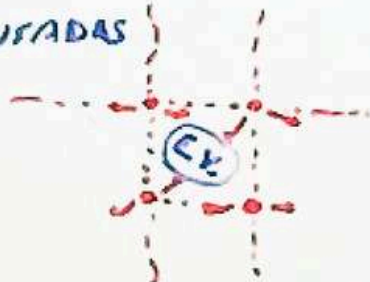
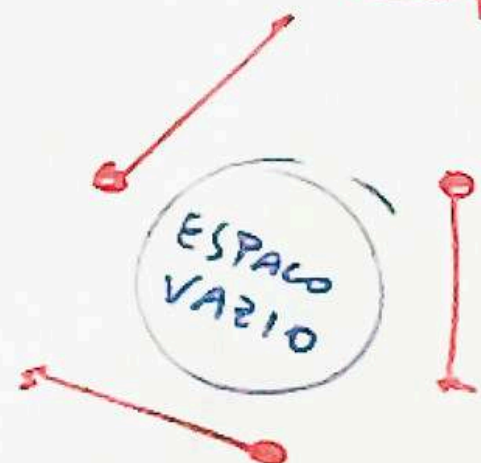
GASES

LÍQUIDOS

SÓLIDOS

FLUIDOS

FASES
CONDENSADAS



PARTÍCULAS:

ALTA COMPRES.

$$K \gg V$$

VOLUME DEFINIDO

BAIXA COMPRESSIBILIDADE

$$K \ll V$$

VOLUME DEFINIDO

BAIXÍSSIMA COMPRES.

MAIS FLUÍDA

SEM VOLUME DEFINIDO

VERTIDO
TRANSFÉRIDO

INTERAÇÕES AUMENTAM
GÁS \xleftarrow{PE} LÍQUIDO \xleftarrow{PF} SÓLIDO

AUMENTA TEMPERATURA
AUMENTA ENERGIA CINÉTICA

$$K = f(T, P \text{ CTE})$$

AUMENTA PRESSÃO

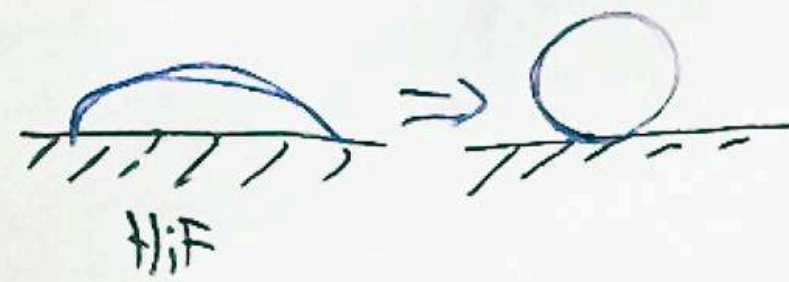
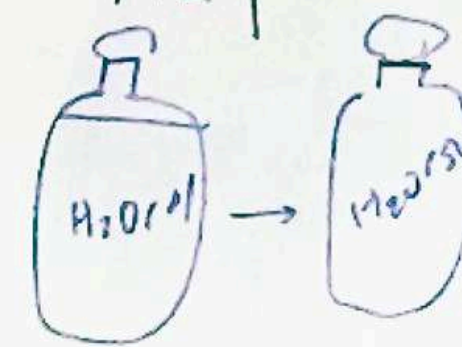
AUMENTA V

INTERAÇÕES MAIS FORTES: $PF, PE \uparrow$

HIDROFÓBICO: ANTI-ÁGUA

HIDROFÍLICO: PRO-ÁGUA

| $25^\circ C$ | | |
|--------------|---------------|----|
| (g) F_2 | \rightarrow | F |
| (l) Cl_2 | \rightarrow | Cl |
| (l) Br_2 | \rightarrow | Br |
| (s) I_2 | \rightarrow | I |

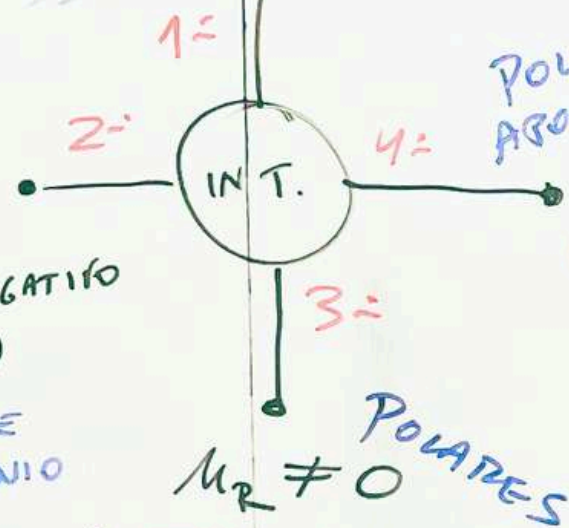


TIPOS DE INTERAÇÕES

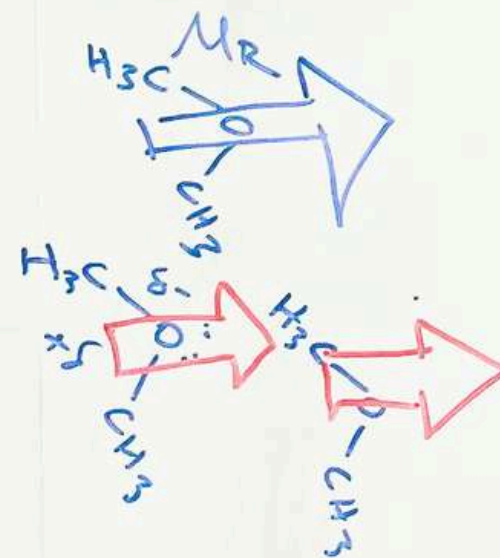
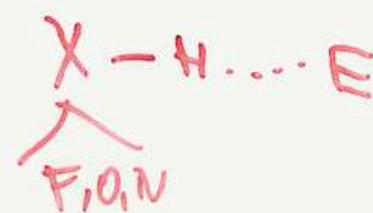
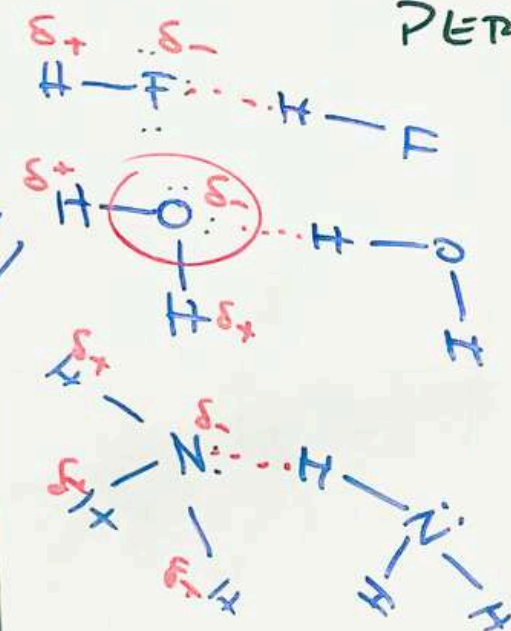
ION-ION
-DIP. PER.
-DIP. IND.

$Q \neq 0$

TEM H
LIGADO A
ÁTOMO
ELETRONEGATIVO
(F, O, N)
LIGAÇÃO DE
HIDROGÊNIO



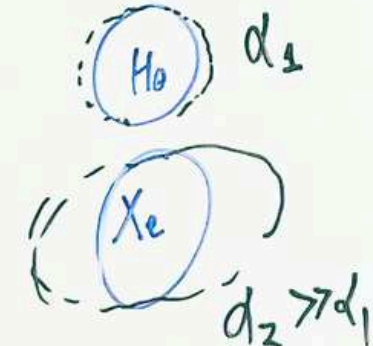
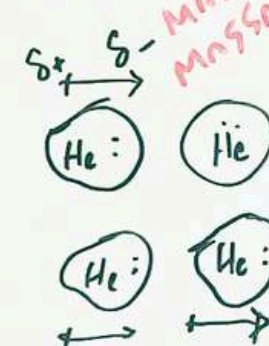
POLARES
 $\mu_R \neq 0$
INTERAÇÕES DIPOLAR
PERMANENTE-DIP. PERM.



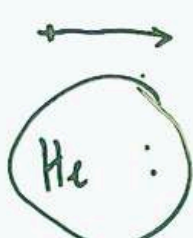
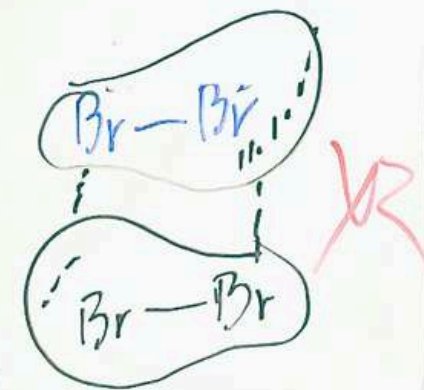
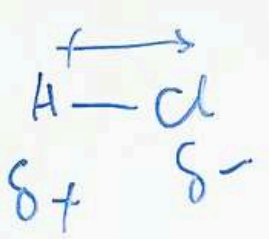
DIPOLAR-INDUZIDO
DIPOLAR-INDUZIDO

POLARES
ABOLARES
TEM μ
FORÇAS DE DISPERSÃO
(DE LONDON)
POLARIZABILIDADE

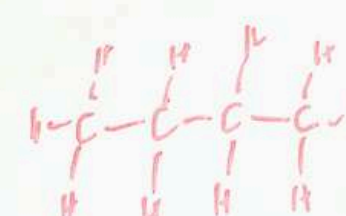
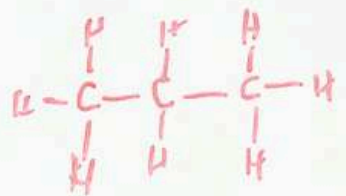
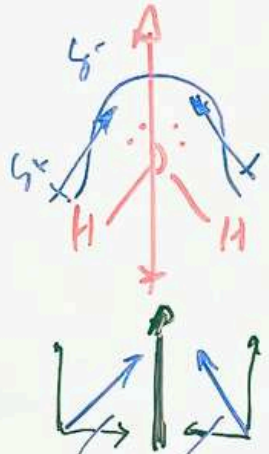
MAIOR COM
MAIS ELÉTRONS



MAIOR
MAIS ÁTOMOS
FUNÇÃO
COMO NÚMERO
(PODE SER
DISTORÇÃO)

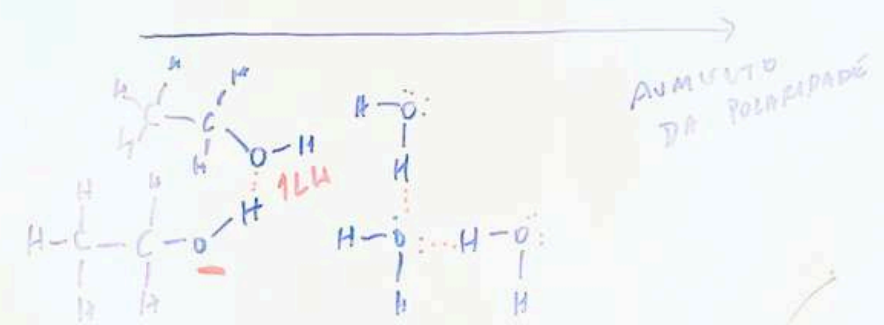


DIPOLAR
INSTANTÂNEO

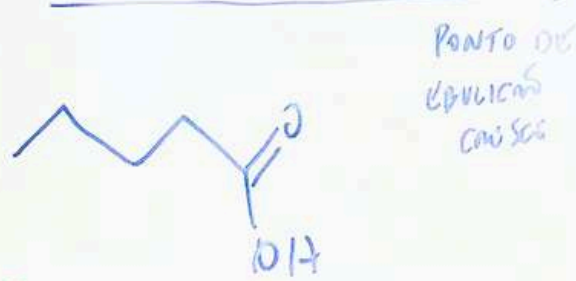


PE
AUMENTA

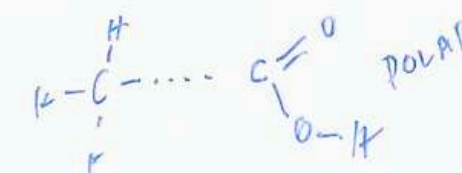
| | | | | |
|-------|-------------------|-------------------|-------------------|-------------------|
| | <chem>CCCC</chem> | <chem>CCOC</chem> | <chem>CC=O</chem> | <chem>CC#N</chem> |
| M | 44 u.m.a. | 46 u.m.a. | 44 u.m.a. | 41 u.m.a. |
| μ | 0,1 D | 1,3 D | 2,7 D | 3,7 D |
| PE | 231 K | 248 K | 291 K | 355 K |



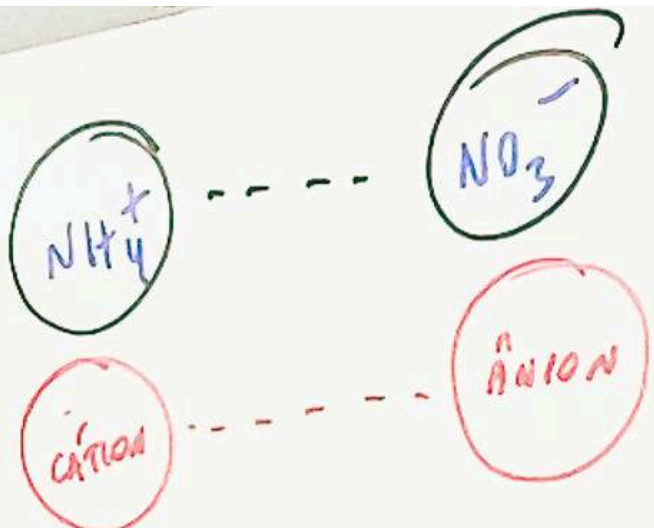
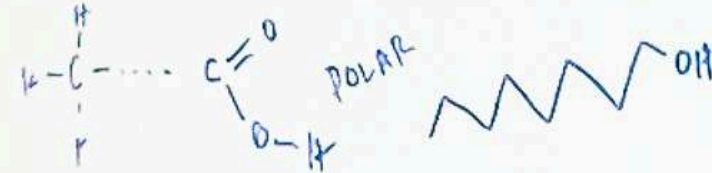
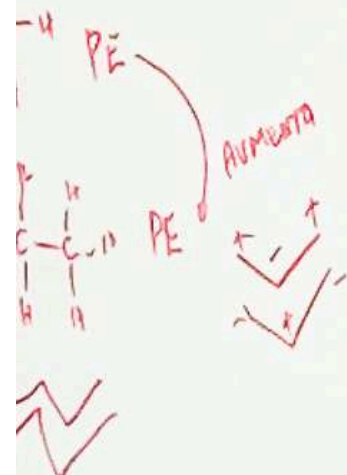
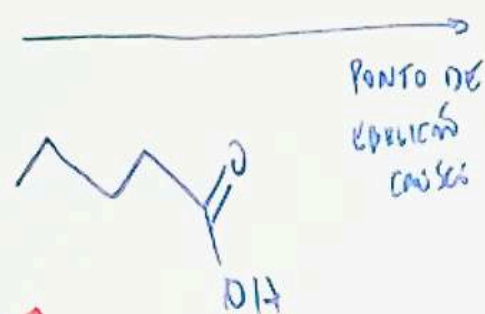
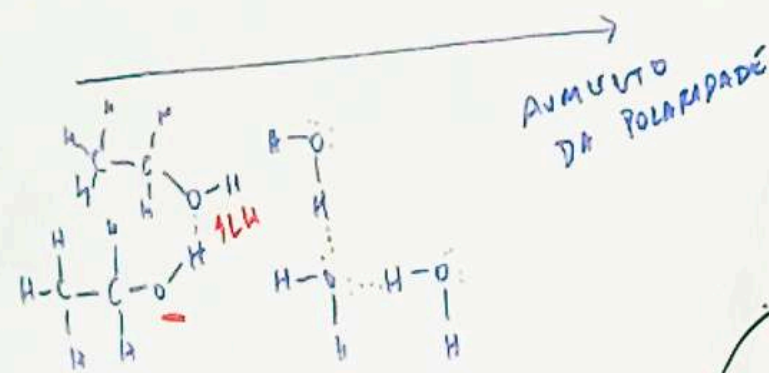
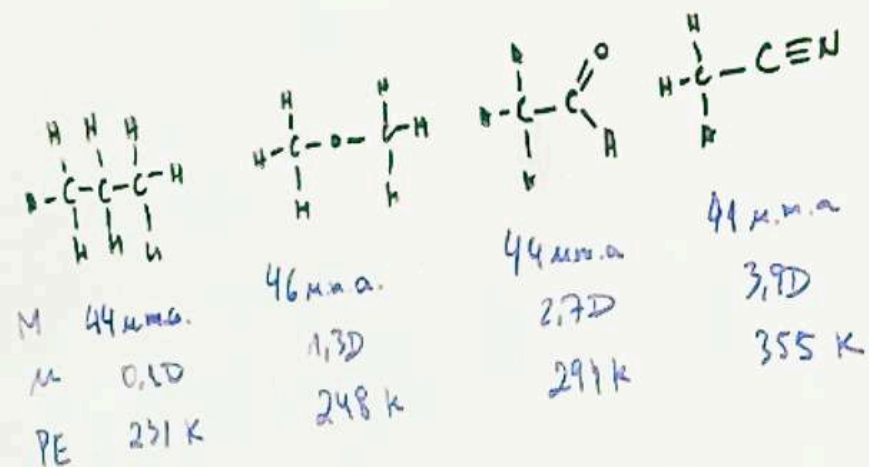
AUMENTO
DA POLARIDADE



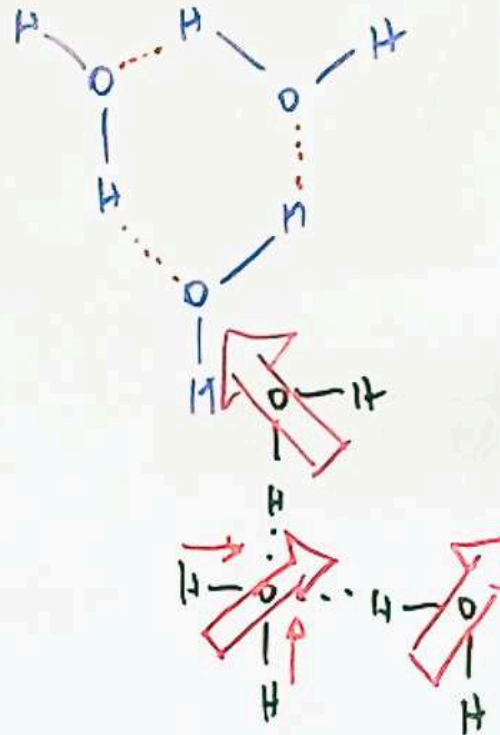
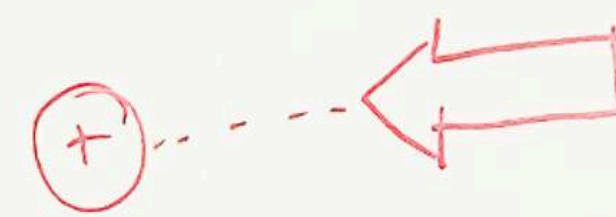
PONTO DE
EBULIÇÃO
COM SE



POLAR



ÍON-ÍON



LIF

$\pm 0,852$ $-0,957e$