ACTIVIDAD 6

P1)

$C_2 + 1e$

σ_{2p} □

π^*_{2p} | |

σ_{2p} ↑

π_{2p} ↑↓ ↑↓

σ^*_{2s} ↑↓

σ_{2s} ↑↓

→ aumenta orden de enlace

$O_2 + 1e^-$

□ σ^*_{2s}

↑↓ ↑ π^*_{2p} → disminuye orden de enlace

↑↓ ↑↓ π_{2p}

↑↓ σ_{2p}

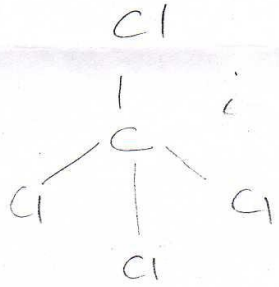
↑↓ σ^*_{2s}

↑↓ σ_{2s}

→ opción d) $\text{orden de enlace} = \frac{1}{2}(e_{\text{enlace}} - e_{\text{antienlace}})$

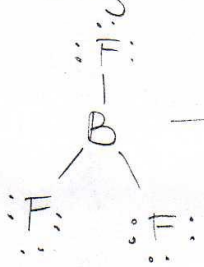
P2) $N_1 : sp^3, 109{,}5°$
$C_2 : sp^2, 120°$
$O_3 : sp^3, 109{,}5°$
} opción b)

P3) a) CCl_4 sp^3, mom dip = 0



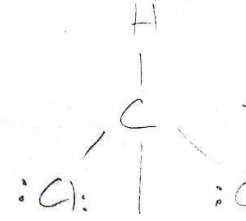
Los Cl se anu

b) BF_3 e val = 3 + 3x 7 = 24



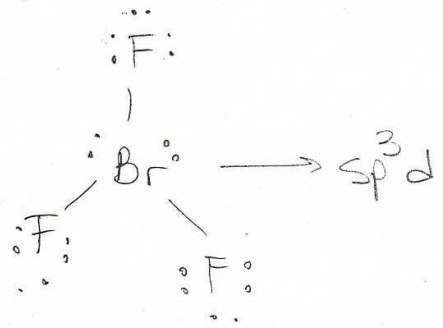
→ sp^2

c) $CHCl_3$ e val = 4 + 1 + 7x3 = 26

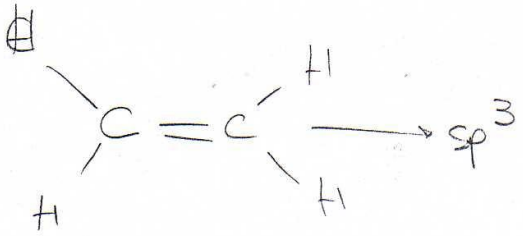


→ sp^3 ← Aquí el H no cumple la EN de los Cl

d) BrF_3 e val = 7 × 4 = 28

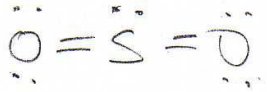


e) C_2H_4



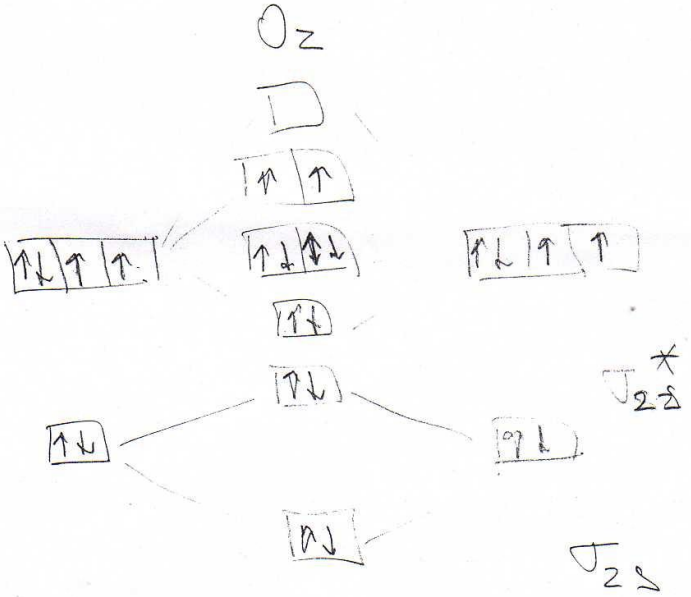
⇒ Alternativa correcta c)

P4) SO_2 e val = 6 × 3 = 18



→ hibridación sp^2, alternativa d)

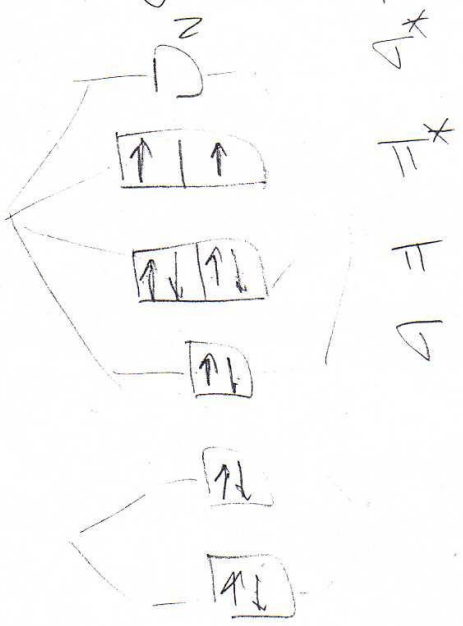
P5)



→ alternativa d)

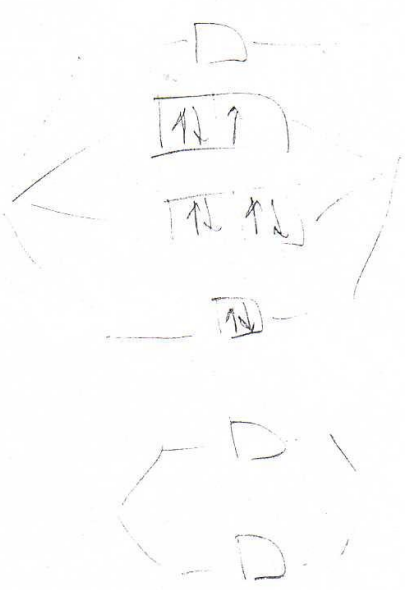
a)

O_2^{2-} e val = $12 = 6 \times 2$



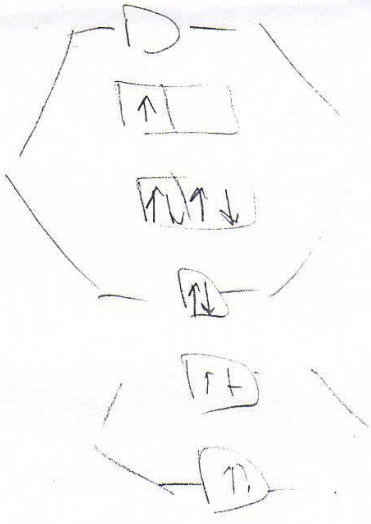
order entaire $= \frac{1}{2}(6-2) = 2$

O_2^-



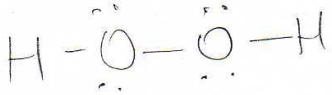
order entaire $= \frac{1}{2}(6-3) = \frac{3}{2}$

O_2^+



order entaire $= \frac{1}{2}(6-1) = \frac{5}{2}$

HOOH



$HOOH > O_2^- > O_2 > O_2^+$

b)

P7) 248 [g] $T_i = 0\,^\circ C$ $T_f = 154\,^\circ C$

$$q = n\left(c_{p_l}(T_{eb} - T_i) + \Delta H_{vap} + c_{p_v}(T_f - T_{eb})\right)$$

$$n = \frac{248\,[g]}{18\,[g/mol]} = 13{,}7\,[mol]$$

$$q = 248[g] \cdot 4{,}184\,[J/g\,^\circ C]\,(100-0)^\circ C + 13{,}7\,[mol] \times 40{,}79\,[KJ/mol]$$
$$+ 248\,[g] \cdot 1{,}99\,[J/g\,^\circ C]\,(154-100)^\circ C$$
$$= 692\,[KJ]$$

P8) $\Delta H_{vap} = 31\,[KJ/mol]$ $T_1 = 26\,^\circ C$ $P_1 = 100$ torr
$T_2 = 45\,^\circ C$

$$\ln\left(\frac{P_2}{P_1}\right) = -\frac{\Delta H_{vap}}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$\ln P_2 - \ln P_1 = \frac{-\Delta H_{vap}}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$$

$$\ln P_2 = -\frac{31\,[KJ/mol]}{8{,}31\,[J/K\,mol]} \cdot \left(\frac{1}{45+273\,K} - \frac{1}{26+273\,K}\right) + \ln(100$$

$$= 5{,}34 \rightsquigarrow P_2 = 209{,}1 \text{ torr} \rightarrow \text{op d)}$$

9. cubica centrada en las caras → 4 átomos

$a = 0{,}559\ [nm]$

$V_{celda} = a^3 = 1{,}746 \times 10^{-28}\ [m^3]$

$PA_{Kr} = 83{,}798\ [g/mol]$

$P_{atomo} = 83{,}798\left[\frac{1}{mol}\right] \cdot \frac{1\ mol}{6{,}02 \times 10^{23}\ atomos} = 1{,}39 \times 10^{-22}\ g/atom$

$m_{celda} = 4 \times 1{,}39 \times 10^{-22}\ g = 5{,}56 \times 10^{-22}\ g = 5{,}56 \times 10^{-25}\ Kg$

$\rho = \frac{m}{V} = \frac{5{,}56 \times 10^{-25}\ Kg}{1{,}746 \times 10^{-28}\ [m^3]} = 3{,}18 \times 10^{3}\ Kg/m^3 \rightarrow$ b)

P10) $a = 502\ [pm]$

cubica centrada en el cuerpo $\Rightarrow a = \frac{4r}{\sqrt{3}}$

$r = \frac{a\sqrt{3}}{4} = 2{,}17 \times 10^{-10}\ m \approx 271{,}3\ pm \rightarrow$ b)

P11) b) obvia!

P12) a)

P13) c)

PM] El Au cristaliza en una estructura cubica compacta (cubo centrado en las caras) y tiene una densidad de 19,3 [g/cm³]. Calcule el radio atómico.

$$\rho = \frac{m}{V}$$

$$m_{celda} = 4\ m_{átomo}$$

$$= 4 \cdot \frac{PM}{N_A} = 4 \cdot \frac{197\ g/mol}{6,02 \times 10^{23}\ átomos/mol} = 1,31 \times 10^{-21}\ g$$

$$V = \frac{m}{\rho} = 6,79 \times 10^{-23}\ cm^3$$

$$a^3 = V \rightarrow a = \sqrt[3]{V} = 408\ pm$$

$$a = \sqrt{8}\ r \rightarrow r = 144\ pm$$