EXO1

(0,25)

① Hydrogénoïde : est un atome qui a perdu tous ses électrons sauf un.

ex : $_2He^+$, Li^{+2} et $_4Be^{+3}$ (0,25)

② Période : même n, $Z\uparrow \Rightarrow \vec{F_a}\uparrow \Rightarrow R\downarrow$ (0,5)

Colonne : $n\uparrow$ ~~et~~ $Z\uparrow \Rightarrow R\uparrow$ (0,5)

③ $3^{ème}$ niveau E : 3S 3P 3d

S : 2é, P : 6é et d : 10é (0,5)

⇒ nbr d'é : **18 é** (0,5)

4) a) F
b) F
c) V
d) V
e) V
f) : F

(0,5) × 6

EXO2

a)

Atome	CE (0,25×5)	Période (0,25×5)	G/SG (0,25×5)
$_9F$	$1s^2 2s^2 2p^5$	2	A VII
$_{15}P$	$[Ne]_{10}\ 3s^2 3p^3$	3	A V
$_{19}K$	$[Ar]_{18}\ 4s^1$	4	A I
$_{24}Cr$	$[Ar]_{18}\ 3d^5 4s^1$	4	B VI
$_{47}Ag$	$[Kr]_{36}\ 4d^{10} 5s^1$	5	B I

b) Halogène : F (0,25)

élément de transition : Cr, Ag (0,25)

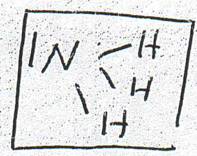
Alcalin : K (0,25)

c) Formule de Lewis

NH_3 : N : $1s^2 2s^2 2p^3$

$|\dot{N}\cdot + 3(\cdot H)$

⇒

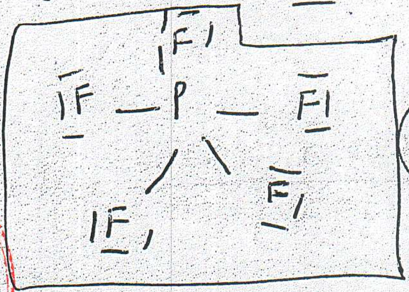


(0,5)

PF_5 : P : [↑↓] [↑ | ↑ | ↑]

F : [↑↓] [↑↓ | ↑↓ | ↑] ⇒ $\cdot\overline{F}|$

$|P\cdot + 5\ \cdot\overline{F}| \rightarrow$



(0,5)

AsO_3^{-3}

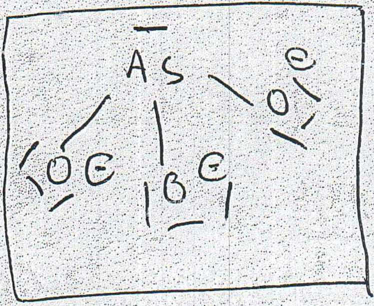
$_{33}As$: $[Ar]_{18}\ 4s^2 3d^{10} 4p^3$

[↑↓] 4s [↑ | ↑ | ↑] 4p

$_8O^-$: [↑↓] [↑↓ | ↑↓ | ↑]

$_8O^-$: [↑↓] [↑↓ | ↑↓ | ↑]

O^- : [↑↓] [↑↓ | ↑↓ | ↑]



(0,5)

$PH_3 \rightarrow AX_3E \rightarrow$ Pyramide trigonale (0,25)

$PCl_5 \rightarrow AX_5 \rightarrow$ Bipyramide trigonale (0,25)

Exo3 (5P)

A) $\Delta E = E_1\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$ $(E_1 = 13,6\ eV)$ (0,25)

$\begin{cases} n_1 = 1 \\ n_2 = 3 \end{cases} \Rightarrow \Delta E = 12,08\ eV$ (1)

$\Delta E = 12,08 \times 1,6 \times 10^{-19} = 19,34 \times 10^{-19}\ J$

$\Delta E = \frac{hc}{\lambda} \Rightarrow \lambda = \frac{hc}{\Delta E}$ (0,25)

$\lambda = \frac{6,62 \times 10^{-34} \times 3 \times 10^{8}}{19,34 \times 10^{-19}} \Rightarrow \begin{cases} \lambda = 1,026 \times 10^{-7}\ m \\ \lambda = 1026\ A^\circ \end{cases}$ (0,75)

B) $\begin{cases} \frac{1}{\lambda} = 0,176 \times 10^{9}\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right) \\ \frac{1}{\lambda} = R_H Z^2\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right) \end{cases}$ (0,25)

$\Rightarrow R_H Z^2 = 0,176 \times 10^{9} \Rightarrow Z^2 = 16$

et $\boxed{Z = 4}$: ${}^{9}_{4}Be^{+3}$ $(q = +3)$ (0,75) (0,25)

C- H_2 : $1s^2$

$E_{1s} = -\frac{13,6}{n^2} Z^{*2}$ (0,25)

$Z^* = Z - \sigma = 2 - 0,31 \Rightarrow Z^* = 1,69$

$\Rightarrow E_{1s} = \frac{-13,6}{1^2} Z^{*2} \Rightarrow E_{1s} = -38,84\ eV$ (0,5)

$E_T = 2 E_{1s} \Rightarrow \boxed{E_T = -77,68\ eV}$ (0,5)

Exo4

* $\vec{F}_m = \vec{F}_c \Rightarrow qvB = \frac{mv^2}{R}$ (0,25)

$\Rightarrow qB = \frac{mv}{R}$ et $m = \frac{M}{N_A}$

$\Rightarrow R = \frac{Mv}{N_A q B}$ (0,25) $(q = e)$

$R_1 = \frac{M_1 v}{N_A e B}$ et $R_2 = \frac{M_2 v}{N_A e B}$

$\begin{cases} R_2 - R_1 = \frac{d}{2} \\ R_2 - R_1 = \frac{v}{N_A e B}(M_2 - M_1) \end{cases}$ (0,25) (0,25)

$\Rightarrow v = \frac{N_A e B d}{2(M_2 - M_1)}$ (1)

$\boxed{v = 2,89 \times 10^{5}\ m/s}$ (0,5)

$e = 1,6 \times 10^{-19}\ C$

$M_2 = 21 \times 10^{-23}\ kg$

$M_1 = 20 \times 10^{-23}\ kg$

$N_A = 6,023 \times 10^{23}$