Corrigé de l'examen de Rattrapage (2026)

EXO1 (05pts)

1) $^{238}_{92}U \longrightarrow {}^{234}_{90}Th + {}^{4}_{2}He$ (1)

2) $m_t = m_0 e^{-\lambda t}$ (1) $\Rightarrow Ln\frac{m_0}{m_t} = \lambda t \Rightarrow \lambda = \frac{Ln\frac{m_0}{m_t}}{t} = 2,3.10^{-2}\ ans^{-1}$ (0,5)

$T = Ln2/\lambda = 0,3.10^{2}$ ans (0,5) (1)

3) $238\,g \longrightarrow N_A$ (0,5)

$10^{-3}\,g \longrightarrow x = 2,53.10^{18}$ noyaux (0,5)

EXO2 (05pts)

1) $v = 2,19.10^{6}\frac{Z}{n}$ (0,5) $n=3 ; Z=3 \Rightarrow v = 2,19.10^{6}\ m/s$ (1)

2) $1/\lambda = R_H Z^2\left(\frac{1}{n_i^2} - \frac{1}{n_f^2}\right)$ (0,5)

3ème raie de Balmer : $n_i = 2$ et $n_f = 5$

$\Rightarrow \lambda = 48,1.10^{-9}\ m$ (1)

3) $\Delta E = E_2 - E_1$ (0,5) ; $E_1 = -\frac{13,6 Z^2}{n^2}$ (0,5) $\Rightarrow \Delta E = E_i = -E_1 = 122,4\ eV$. (1)

EXO3 (10pts)

1) $_5B : 1s^2 2s^2 2p^1$ (0,5) (Période 2 et type III_A) (0,5)

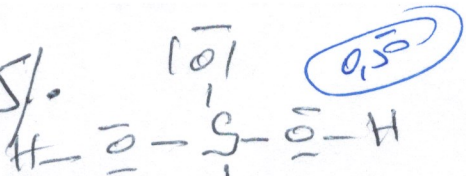
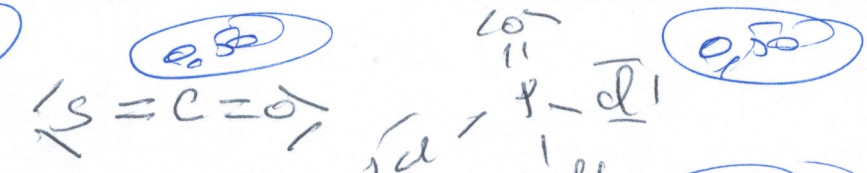
2)

	n	ℓ	m	s	
$2s^1$	2	0	0	+1/2	(0,5)
$2s^2$	2	0	0	−1/2	(0,5)
$2p^1$	2	+1	−1	+1/2	(0,5)

3) $_{13}X = 1s^2 2s^2 2p^6 3s^2 3p^1$ (0,5) et $_{31}Y : 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^1$. (0,5)

4) Dans le même type $2^{ème}$ de Couche $n \nearrow \Rightarrow F_{attract\ noy-e^-} \searrow \Rightarrow$

E_i et χ_i (0,5) $\Rightarrow E_B > E_X > E_Y$. (0,5) et $\chi_B > \chi_X > \chi_Y$. (0,5)

5/.  (0,50) (0,50)  (0,50)

Tétraèdre (0,50) linéaire (0,50) Tétraèdre (0,50)

6/. $^{11}_{5}B \longrightarrow {}^{1}_{1}p + {}^{4}_{0}$ (0,50)

$\Delta E = \Delta m c^2 = 1{,}38 \cdot 10^{-11}$ J. (1)

(0,50)