Corrigé Série N-1 UEF-5 M-1 Chim. Pharm.

Exercice-1

$\lambda = \frac{3.10^8 m/sec}{5.10^{14} sec^{-1}} = 0{,}6 \times 10^6 m = 0{,}6\ \mu m =$
$600nm\ \ visible\ (Lumière\ Rouge)$

Exercice-2

$$\mathcal{V} = \frac{c}{\lambda} = \frac{3 \times 10^8 m/sec}{1 \times 10^{-3} m} = 3.10^{11} Hz$$

Exercice-3

- $E = h\mathcal{V} = h\frac{c}{\lambda} = \frac{6.62 \times 10^{-34} j.sec \times 3 \times 10^8 m/sec}{750 \times 10^{-9} m} = 2{,}65 \times 10^{-19} J$

$$E = \frac{2.65 \times 10^{-19} J}{1{,}6 \times 10^{-19} J/eV} = 1{,}7 eV$$

- $\mathcal{V} = 1.5 \times 10^{15}\ Hz$ en cm^{-1}

$$\Delta E = h\mathcal{V} = h\frac{c}{\lambda} = hc\bar{\mathcal{V}} \Rightarrow \mathcal{V} = c\bar{\mathcal{V}} \Rightarrow \bar{\mathcal{V}} = \frac{\mathcal{V}}{c} = \frac{1.5 \times 10^{15} sec^{-1}}{3 \times 10^{10} cm.sec^{-1}}$$
$$= 0.5 \times 10^5 cm^{-1}$$

- $\mathcal{V} = 1.5 \times 10^{15}\ Hz$ en $joule$

$$\Delta E = h\mathcal{V} = \ 6.62 \times 10^{-34} j.sec \times 1.5 \times 10^{15} sec^{-1}$$
$$= \ 9.93 \times 10^{-19} J$$

- $\mathcal{V} = 1.5 \times 10^{15}\ Hz$ en erg

$$\Delta E = h\mathcal{V} = \ 6.62 \times 10^{-27} erg.sec \times 1.5 \times 10^{15} sec^{-1}$$
$$= \ 9.93 \times 10^{-12} erg$$

- Pour l'eV on a $1\ eV = \ 1.602x10^{-19} Joule$

$$\Delta E_{eV} = \frac{9.93\times10^{-19}J}{1.602\times10^{-19}J} = 6.198eV$$

Exercice-4

a-

$$\Delta E = h\mathcal{V}, \overline{\mathcal{V}} = \frac{c}{\lambda}, \mathcal{V}=\frac{c}{\lambda}$$

Relation de passage de l'$A°(\lambda)$ au $cm^{-1}(\overline{\mathcal{V}})$

$$\overline{\mathcal{V}}_{cm^{-1}} = \frac{1}{\lambda cm} \text{ comme } \lambda cm = \lambda \text{ Å} \times 10^{-8} => \overline{\mathcal{V}}_{cm^{-1}} = \frac{10^8}{\lambda_{Å}} \qquad (1)$$

Relation de passage du cm^{-1} à l'eV:

$$\Delta E_{erg} = hc\,\overline{\mathcal{V}}_{cm^{-1}} = 6{,}625.10^{-27} \times 3.10^{10}\,\overline{\mathcal{V}}_{cm^{-1}}$$

$$= 19{,}875.10^{-17}\,\overline{\mathcal{V}}_{cm^{-1}} \text{ comme } \Delta E_{erg} = \Delta E_{eV}\,.1{,}602.10^{-12}$$

$$\Delta E_{eV} = \frac{19{,}875.10^{-17}}{1{,}106.10^{-12}}\,.\overline{\mathcal{V}}_{cm^{-1}} \qquad \Delta E_{eV} = \frac{\overline{\mathcal{V}}_{cm^{-1}}}{8066} \qquad (2)$$

Relation de passage de l'Å (λ) à la l'eV (ΔE) :

Il suffit de combiner les relations précédentes (1) et (2)

$$\Delta E_{eV} = \frac{12400}{\lambda_{Å}} \qquad (3)$$

b-

On utilise pour cela

$$\Delta E_{erg} = h\nu_{Hz} = hc\overline{\mathcal{V}}_{cm^{-1}} \text{ et } \Delta E_{erg} = \Delta E_{eV}\,.1{,}602.10^{-12}$$

	eV	erg	cm^{-1}	Hz
eV	1	$1{,}602.10^{-12}$	8065,73	$2{,}418.10^{14}$
erg	$6{,}242.10^{11}$	1	$5{,}03448.10^{15}$	$1{,}50929.10^{26}$
cm^{-1}	$1{,}2398.10^{-15}$	$1{,}9863.10^{-16}$	1	$2{,}998.10^{10}$
Hz	$4{,}13558.10^{-15}$	$6{,}6256.10^{-27}$	$3{,}33565.10^{-11}$	1

c-

dans le but d'utiliser le tableau du spectre électromagnétique déterminons la longueur d'onde de chacune des radiations considérées :

$.E = 2eV \rightarrow \lambda_{Å} = \frac{12.400}{2} = 6.200 \ \ Å \qquad visible$

$. \overline{\mathcal{V}} = 2.500 cm^{-1} \rightarrow \lambda_{Å} = \frac{10^8}{2.500} = 4.10^4 Å \qquad I.R.$

$. \overline{\mathcal{V}} = 50.000^{-1} \rightarrow \lambda_{Å} = \frac{10^8}{5.10^4} = 2.10^3 Å \qquad U.V.$

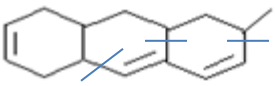
$. \overline{\mathcal{V}} = 100 cm^{-1} \rightarrow \lambda_{Å} = \frac{10^8}{100} = 10^6 \ Å \qquad I.R.lointian$

$.\lambda = 25.10^4 Å \qquad I.R.$

$. \overline{\mathcal{V}} = 6.10^7 Hz \rightarrow \lambda_{Å} = \frac{3.10^{10}.10^8}{6.10^7} = 5.10^{10} Å \qquad Radio$

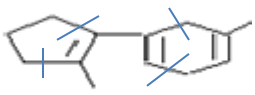
Exercice-5

Calcul de $\boldsymbol{\lambda max}$.

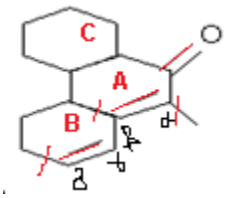


$$\boldsymbol{\lambda max.} = \boldsymbol{\lambda base} + \boldsymbol{incréments}$$

$$\boldsymbol{\lambda max.} = 215nm + 3R = 215 + 3 \times 5nm = 230nm$$

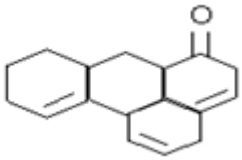


$$\boldsymbol{\lambda max.} = 215nm + 4R = 215 + 4 \times 5nm = 235nm$$

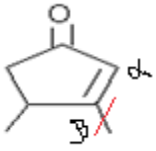


$$\boldsymbol{\lambda max.} = 215nm + \frac{R}{\alpha} + \frac{R}{\beta} + \frac{R}{\delta} + 1dlca + \frac{1exo}{cycleB}$$

$$\boldsymbol{\lambda max.} = 215nm + 10nm + 12nm + 18nm + 30nm + 5nm = \ 290nm$$

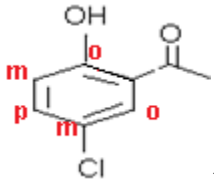


Ce composé n'est pas conjugué ,on peut pas appliquer les règles de Woodward-Fieser–Scott.



Carbonyles cycliques conjugués à $5C$ $\Rightarrow$ $\boldsymbol{\lambda base} = \ 202nm$

$$\boldsymbol{\lambda max.} = 202nm + \frac{R}{\beta} = 202nm + 12nm = 214nm$$



$X = R \Rightarrow \ \boldsymbol{\lambda base} = 246nm$

$$\boldsymbol{\lambda max.} = 246nm + \frac{OH}{ortho} + \frac{Cl}{méta}$$

$$\boldsymbol{\lambda max.} = 246nm + 7nm + 0 = 253nm$$