

الوثيقة المرافقة

مادة العلوم الفيزيائية

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2005

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* الارتيابات * التقويم
* تنظيم التعلمات

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I - _____ :

- توضيحات في المجال
- توضيحات حول الوحدات التعليمية

II - _____

1
- اقتراح التدرج في المفاهيم
- توضيحات في المجال توضيحات حول الوحدات التعليمية
2 التماسك في المادة و في الفضاء
- اقتراح التدرج في المفاهيم
- توضيحات في المجال
- توضيحات حول الوحدات التعليمية

III - _____ :

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Gilles Tremblay

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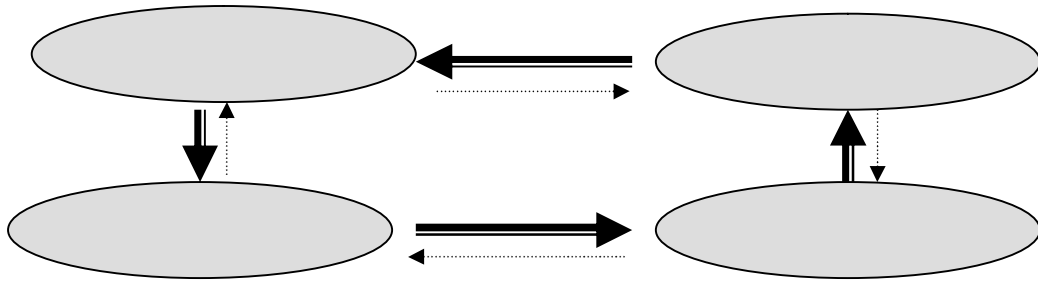
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G. BACHELARD

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$\therefore$ $\square$ $*$
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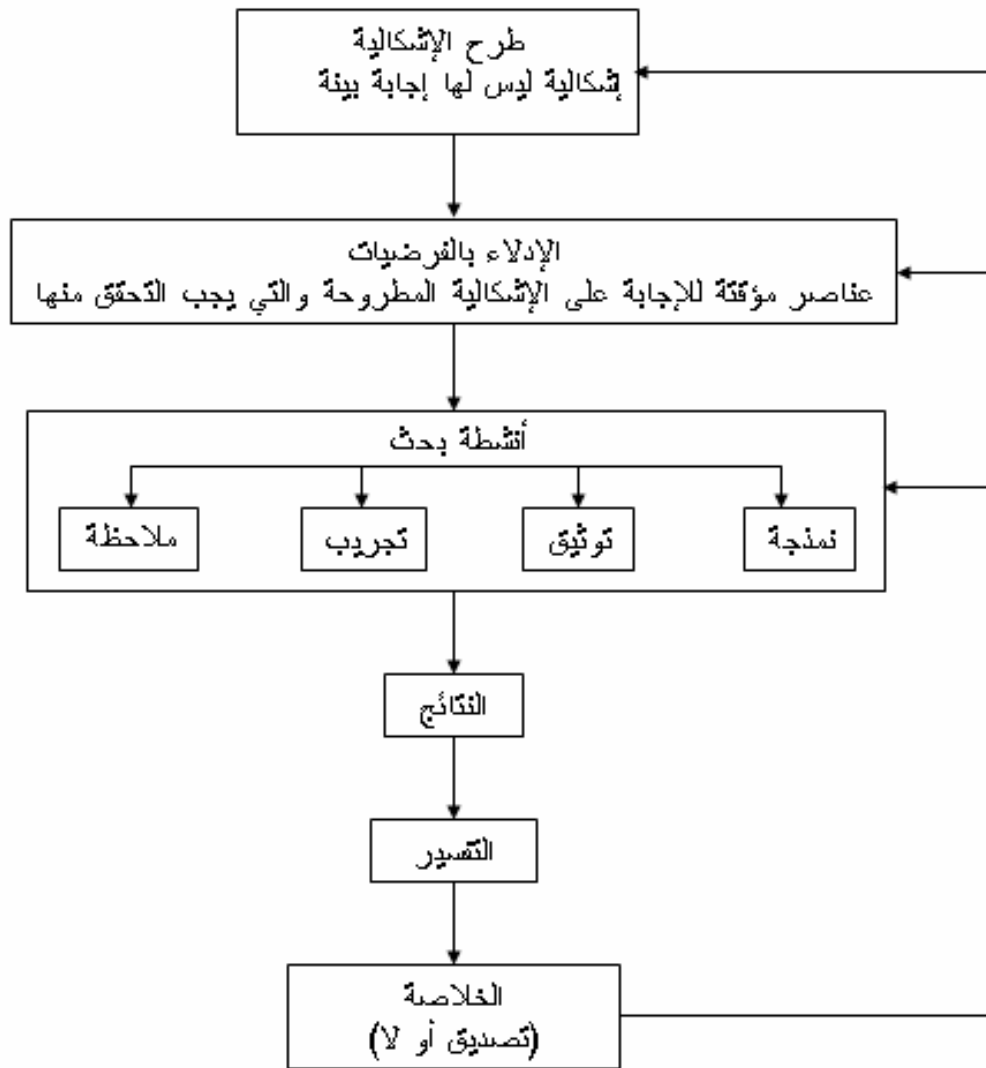
$\therefore$ $\square$

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$\therefore$ $\square$

3-2

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- 2. : () (...)
- 3. : () (...)
- 4. : (...)

-3 (Modélisation et modèles)

: 1-3

: (langages des signes)

.(propositions formées avec des mots)

(outil rationnel) :

(réalité empirique)

:(différents types de modèles) 2-3

(maquettes -) *

() (homothétiques) (représentations concrètes)

.() (analogiques)

.() (intuitivement)

Halbwachs ()

() (modèles descriptifs) -

: () (modèles images) -

(réalité sensible)

Halbwachs

(transcription abstraite de la réalité)

.(modèles symboliques)

.(analogie hydraulique)

(notions)

.(règles d'organisation)

) (langages littéraires)

.(...

)(langages iconiques)

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(langages logico-mathématiques)

:(fonctions d'un modèle)

3-3

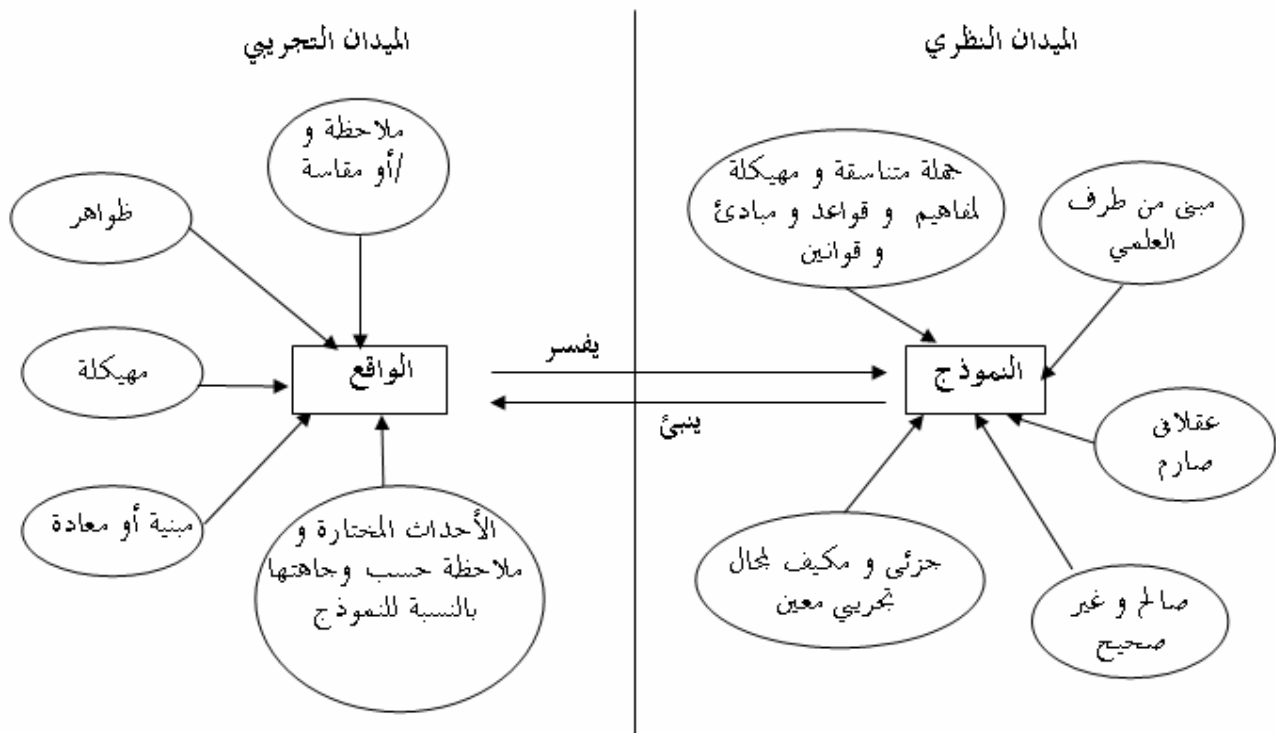
(interprétation)

(prévision)

(explique)

(modèle microscopique corpusculaire)

(modèle de Lewis)



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(structure de la réalité empirique)

4-3

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.(concepts)

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(catégoriels)

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.(approche empiriste)

:(formels)

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.(non contradiction)

(cohérence)

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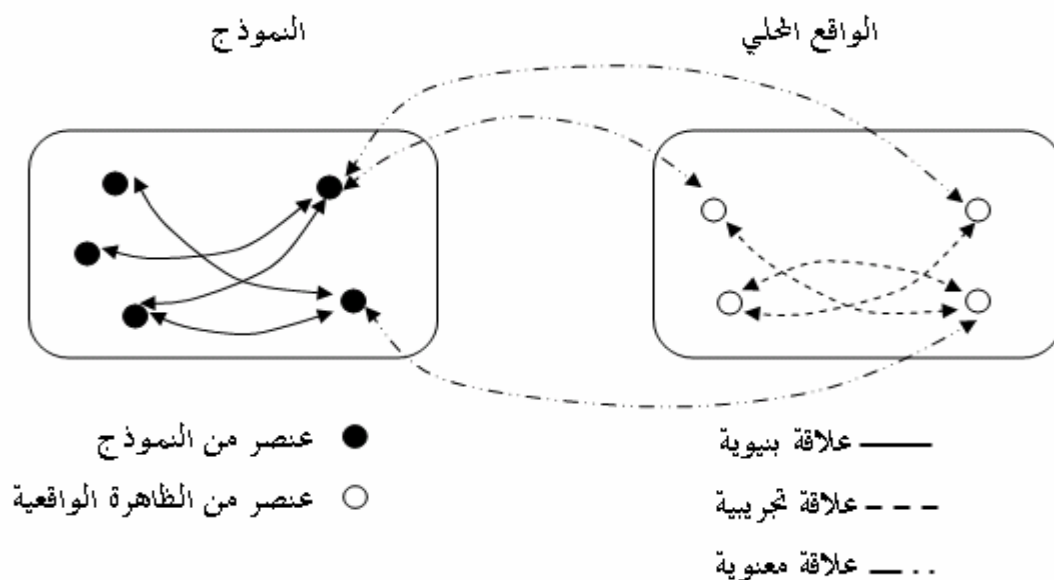
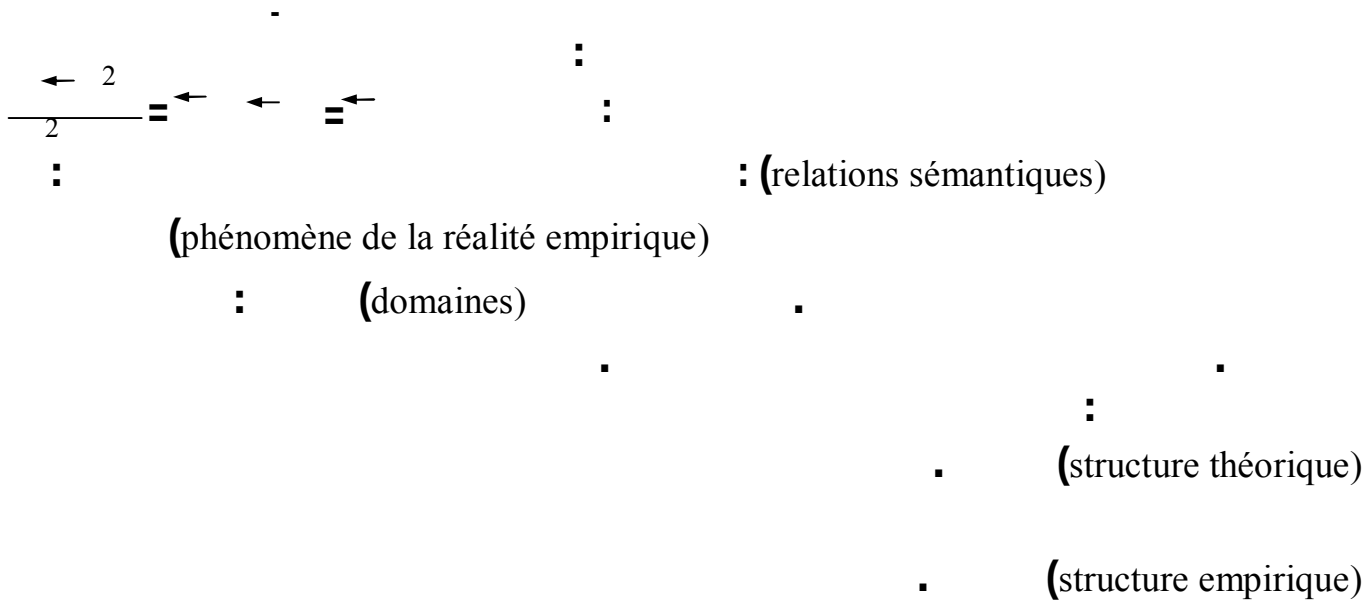
.(rationnelle)

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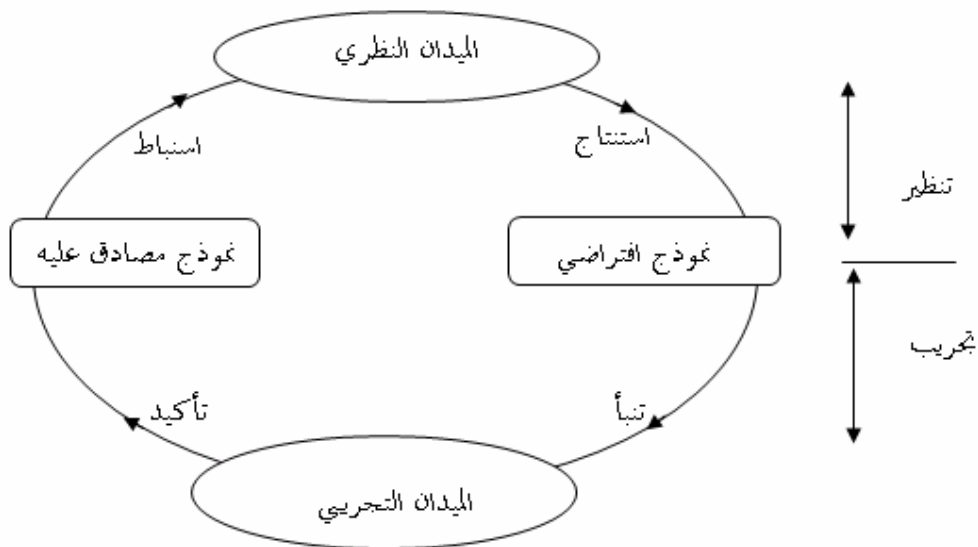
:(relations syntaxiques)

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(démarche) : (validation d'un modèle) **6-3**

(modèles hypothétiques)
 (confirmation) (modèles existants)
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:(phase déductive)

.(hypothèses) (testé)

:(phase prévisionnelle)

: (phase de validation)

:(phase inductive)

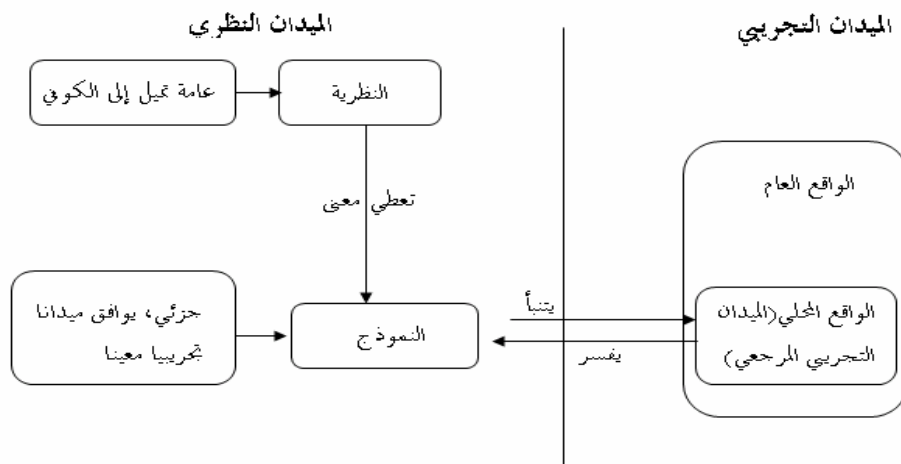
.(réfèrent)

أنشطة بنيوية (activités syntaxiques) (تشغيل)

:(sémantiques)

(invalidé)

7-3

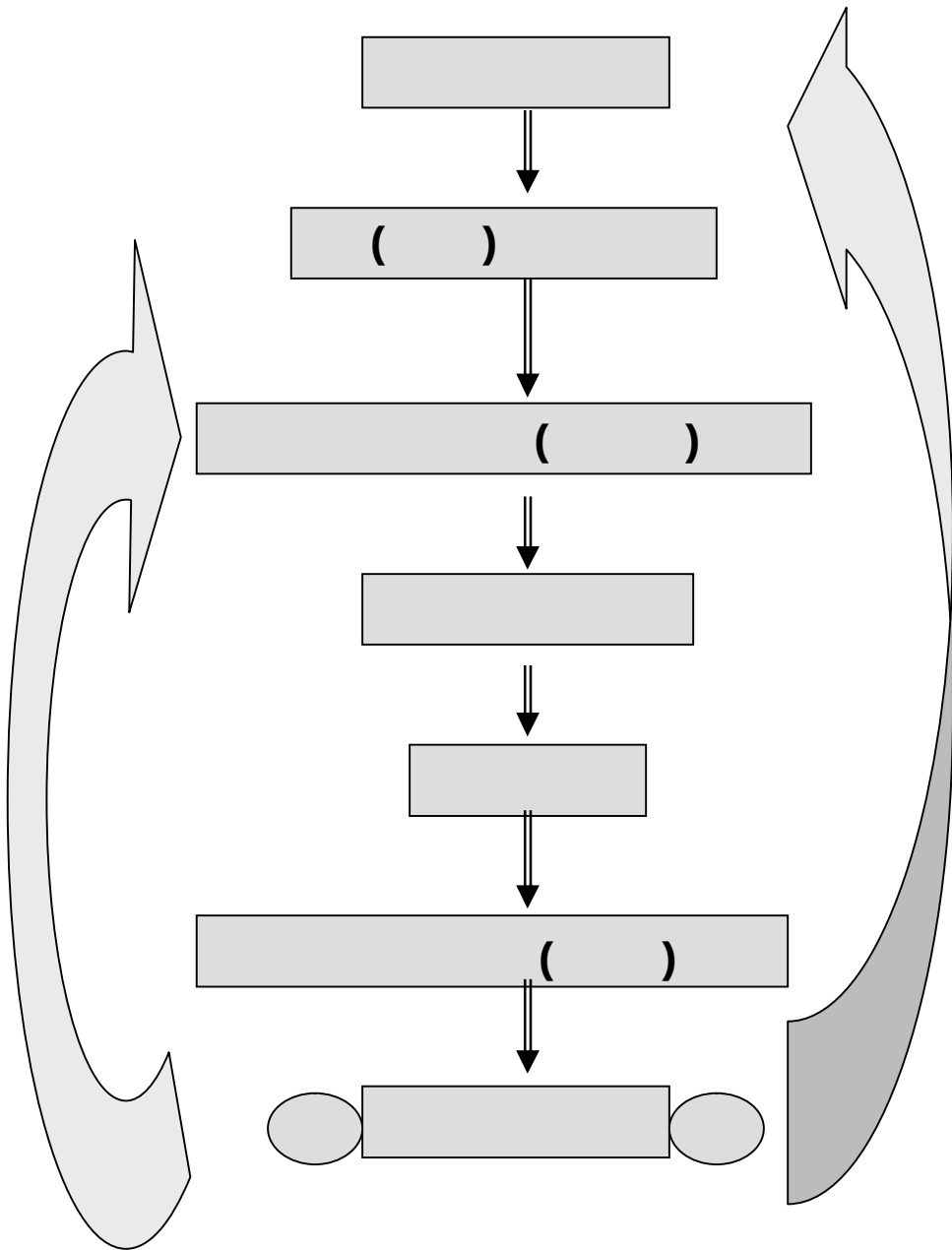


« Eléments d'épistémologie et de didactique des sciences physiques »
de G. Robardet et J-C. Guillaud.

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(Guy Brousseau) "

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:(TICE)

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2	-3	
3	-1 -2	
3	-4	
2	-3	



(. . 8 + 10) -1

TP1 I	:	2
I	: - - -	2
TP2 I	: - - -	2
I	: : - - -	1
I	: - - -	2
TP3 I	: - -	2
I	() - - - -	2
I	CRAM - -	1
TP4 I		2
I		2

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-(1) _____:

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$\times \frac{A}{Z}$ Z A () .

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(s ,p,d,f)

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.(...NO, NO₂)

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.(O₂ , N₂, C₂H₂, C₂H₄)
(CH₄ , NH₃, H₂O, CO₂)
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CRAM

_____ :
(espèce chimique) _____ :TP1 I _____

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Na⁺ H₂O (entités chimiques)

Cl⁻

(OH⁻ H₃O⁺) Cl⁻ Na⁺ H₂O

-2

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▪ () *

▪ (pH) pH < 7 pH *

*

▪ (2 mL 5mL)

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CO₂ *

(- -) :-

▪ Ag NO₃ Cl⁻ *

▪ Fe²⁺

▪ Cu²⁺ *

▪ SO₄²⁻ *

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▪

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(Logiciels)

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،(م 1844-1766)
" insécable "

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A () Z A_ZX N (N + Z =A)

() (pm)	(m)	() (couloumb)	(Kg)			
$3 \cdot 10 \times 2.8$	$15 \cdot 10 \times 2.8$	$19 \cdot 10 \times 1.602$	$31 \cdot 10 \times 9.109$	${}^0_{1-}e$		1881
$3 \cdot 10 \times 1.2$	$15 \cdot 10 \times 1.2$	$19 \cdot 10 \times 1.602$	$27 \cdot 10 \times 1.673$	1_1p		1916
$3 \cdot 10$	$151 \cdot 10$	0	$27 \cdot 10 \times 1.675$	1_0n		1932

_____ :3

530

3.8 cm

2.10^{-3}

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$10^{-3} \approx$

H

$1.67.10^{-24} \text{ g} :$

19.10^3 kg/m^3

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$m_a ($

$m_e)$

-

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$6469.10^{-27} \text{ kg} :$

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$3,1984.10^{-27} \text{ kg} :$

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92

$2953,395.10^{-27} \text{ kg} : (238)$

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:4 _____ *

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n

K n = 1 -

L n = 2 -

M n = 3 -

N n = 4 -

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$.Z > 18$

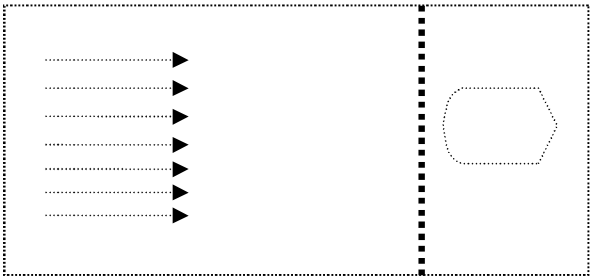
$1 \leq Z \leq 18$

$(K)^2 (L)^8 (M)^7 Z = 17$

:

	Z	
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	1	H
	2	He
	6	C
	8	O
	11	Na
	17	Cl
	10	Ne



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10:

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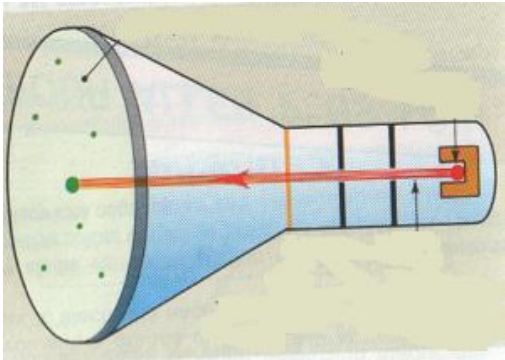
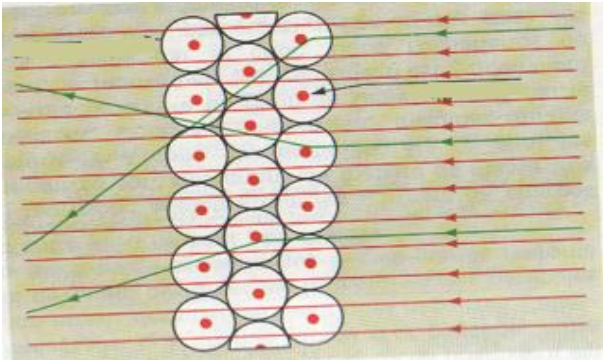
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TP2 I _____

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Diagram illustrating the electron configuration of a transition metal ion, showing the filling of orbitals and the resulting configuration.

The diagram shows the following components:

- Orbitals:** Represented by boxes labeled $4s$, $3d$, and $4p$.
- Electron Configuration:** The configuration is shown as $4s^1 3d^9$.
- Orbital Filling:** The $4s$ orbital is filled with one electron (up arrow). The $3d$ orbitals are filled with nine electrons (five up arrows and four down arrows).
- Energy Levels:** The $4s$ orbital is at a lower energy level than the $3d$ orbitals.
- Labels:** The diagram includes labels for the orbitals ($4s$, $3d$, $4p$) and the resulting configuration ($4s^1 3d^9$).

AgNO_3 (2mL) HNO_3
 C CuO
)

.(Cu^{2+} :

2

%		A	()	
99.984 0.016	¹ ₁ H ² ₁ H ³ ₁ H	1 2 3	1 1 1	H
99.759 0.037 0.204	¹⁶ ₈ O ¹⁷ ₈ O ¹⁸ ₈ O	16 17 18	8 8 8	O
75.4 24.6	³⁵ ₁₇ Cl ³⁷ ₁₇ Cl	35 37	17 17	Cl

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(¹⁴₆C) 14 *

(¹⁸₈O) *

(²³⁵₂₉U) 235 *

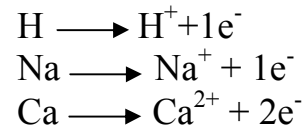
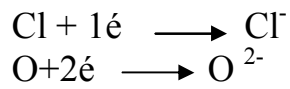
_____ : I _____
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Kr Xe Ne He

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(He)

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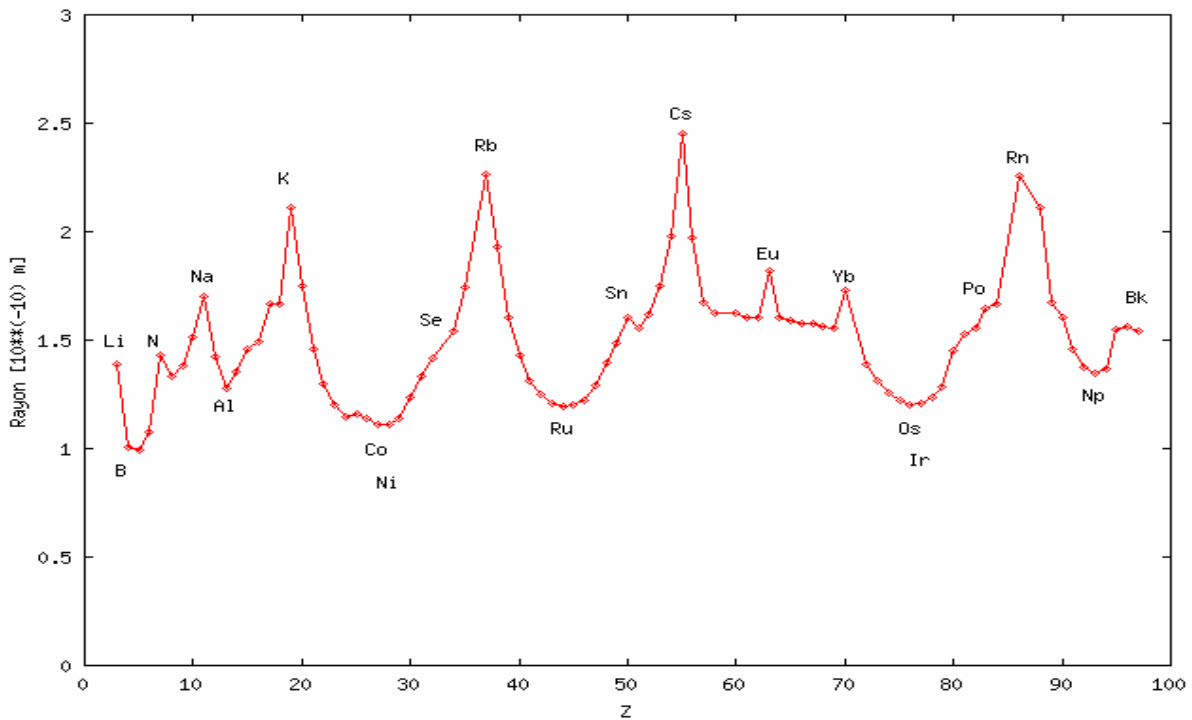
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(15-10):

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(15-10) -2

(10) - 3

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: TP3 I _____

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$(2\text{Na}^+ + \text{SO}_4^{2-})$, $(\text{Na}^+ + \text{Br}^-)$, $(\text{Na}^+ + \text{I}^-)$, $(\text{Na}^+ + \text{Cl}^-)$:

$(\text{Na}^+ + \text{F}^-)$

$(\text{Ag}^+ + \text{NO}_3^-)$:

:

:

$(\text{Na}^+ + \text{Br}^-)$, : 3

$(\text{Na}^+ + \text{Cl}^-)$: 2

$(\text{Na}^+ + \text{F}^-)$:1

$(2\text{Na}^+ + \text{SO}_4^{2-})$:5

$(\text{Na}^+ + \text{I}^-)$:4

(Na) .

*

(5) *

(5) (F⁻, Cl⁻, Br⁻, I⁻ :) *

(Ag⁺) NO₃⁻ : Ag⁺ : *

() (10) - *

:

() () I,Br,Cl,F •

7) () () •

7 17) •

(" ") •

: (X⁻) :) •

(I,Br⁻, Cl⁻, F⁻)

:

(I₂) (Br₂) (Cl₂) •

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I Br Cl : -

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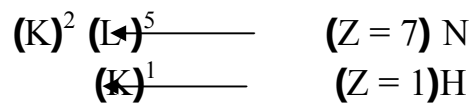
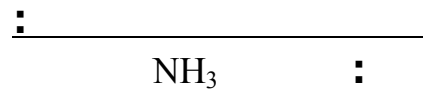
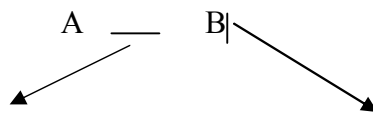
.() -

) Xe,Kr,Ne : -

(2400°C

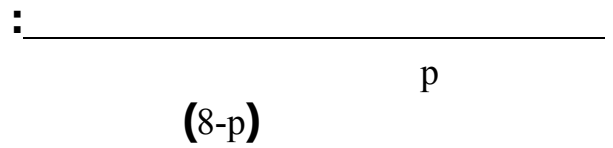
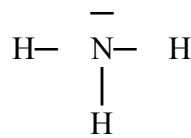
: : I _____

A.B



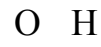
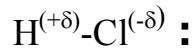
$$8 = (1)3 + 5 = N_e$$

$$4 = 8/2 = N_d$$



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$$0 < \delta < 1$$



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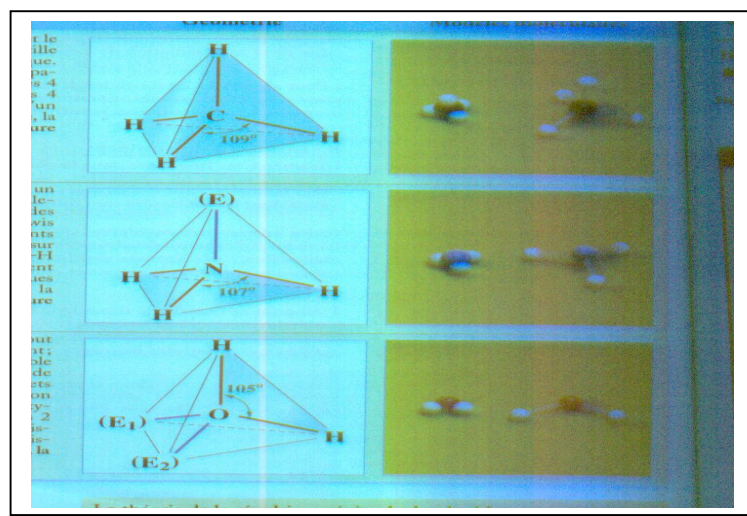
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جزء CH_4 رباعي

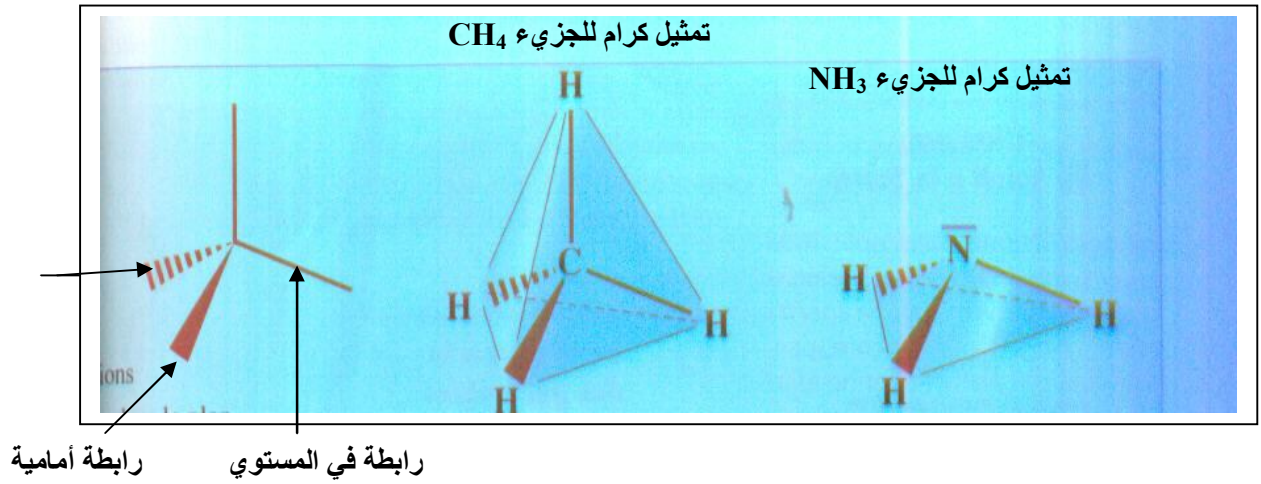


:(cram)

(B

CRAM

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:TP4 I _____

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			C	
		H_2O	$\text{C}_6\text{H}_8\text{O}_6$	$\text{C}_{18}\text{H}_{36}\text{O}_2$
$(\text{g} \cdot \text{mol}^{-1})$				
$(\text{g} \cdot \text{ml}^{-1})$		0.917		0.940
			1.65	
(g)			0.500	
(mol)		1.35		
(ml)				1.20

(

		C ₂ H ₆ O	C ₈ H ₁₈	C ₈ H ₈
(g.mol ⁻¹)				
(g.cm ⁻³)		0.789		0.905
			0.703	
(g)				28
(mol)			3.32	
(ml)		43.2		

: (

		CH ₄	CO ₂	C ₄ H ₁₀
(g.mol ⁻¹)				
(P,T) (L.mol ⁻¹)		22.42	2.447	24.47
		1.013bar ,0°C	10.13 bar ,25°C	1.013bar ,25°C
(g)		73		
(mL)			3420	2.75x10 ⁻³
(mol)				

: 2

C=0.1 mol .L⁻¹.

NaOH

100 mL

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(c'= 0.01mol . L⁻¹)M_H = 1g mol⁻¹ M_O = 16 g mol⁻¹:M_{Na}= 23 g.mol⁻¹

(. . 06 + 10)

II		1
II		1
II		1
II _{TP1}		2
II	-	2
II _{TP2}		2
II	-	1
II		2
II _{TP3}		2
II		2

_____ :

(Mole)

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1 - (Mole) _____ :

(10^{-27} Kg)

(N_A 1 g $N_A =$)

.

2 - _____ :

$$\frac{m}{M} \quad (\quad)$$

$$\cdot \quad : n \quad : M \quad : m : \quad n =$$

$$(P,T)$$

$$n = V/V_m$$

$$: \quad \underline{\hspace{2cm}} \quad -3$$

$$\cdot C = \frac{n}{V} \quad C = \frac{m}{V}$$

$$: \quad \underline{\hspace{2cm}}$$

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$$\cdot (\quad : V$$

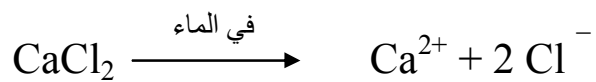
C

$$\cdot [X]$$

X



$$: \quad \underline{\hspace{2cm}}$$



$$n_{Ca^{2+}} = n_{CaCl_2} \quad n_{Cl^{-}} = 2n_{CaCl_2} :$$



$$C : \quad [Ca^{2+}] = C \quad [Cl^{-}] = 2 C :$$

·

V

:

C

V

C'

$$(V' = V + V) V'$$

:

$$C'V' = CV \Leftarrow n' = n$$

$$\underline{\hspace{2cm}} : \underline{\hspace{2cm}}$$

: II _____

$$\begin{aligned}
 & \text{)} \quad {}^{56}\text{Fe} \quad (m = 2 \text{ g} : \text{)} \\
 & \quad \quad \quad (1,67 \times 10^{-27} \text{ kg} = \text{)} \\
 & {}^{56}\text{Fe} \quad = 56 \times 1,67 \times 10^{-27} = 9,0 \times 10^{-26} \text{ kg} = 9,0 \times 10^{-23} \text{ g} \\
 & \quad \quad \quad y = \frac{m}{9 \times 10^{-23}} = \frac{2}{9 \times 10^{-23}} \approx 2 \times 10^{22} \quad (\text{)} :
 \end{aligned}$$

y

$$\begin{aligned}
 & D = 1 \text{ mm} \\
 & l = y \times d = 2 \times 10^{22} \times 1 = 2 \times 10^{22} \text{ mm} = 2 \times 10^{19} \text{ m} \\
 & \quad \quad \quad = 2 \times 10^{16} \text{ Km}
 \end{aligned}$$

(mole)

$$\begin{aligned}
 & \quad \quad \quad 1 \quad : \text{_____} \\
 & (N_A \quad \quad \quad) \text{ } ^{12}\text{C} \quad \quad \quad 12 \text{ g} \\
 & \quad \quad \quad : \text{_____}
 \end{aligned}$$

$$\begin{aligned}
 & \quad \quad \quad N_A = \quad \quad \quad 1 : \\
 & ({}^{56}\text{Fe} \quad \quad \quad) \quad \quad \quad :
 \end{aligned}$$

$$\begin{aligned}
 & y = N_A \cdot n \Leftarrow \\
 & \text{كان } y = N_A \Leftarrow n = 1 \text{ mol}
 \end{aligned}$$

$$\begin{aligned}
 & \text{كتلة } 12 \text{ g من الكربون} \\
 & \text{كتلة ذرة واحدة من الكربون} = N_A
 \end{aligned}$$

$$\begin{aligned}
 & {}^{12}\text{C} \quad \quad \quad \approx 12 \times 1,67 \times 10^{-27} \approx 2 \times 10^{-26} \text{ Kg} \approx 2 \times 10^{-23} \text{ g} \\
 & \quad \quad \quad N_A = \frac{12}{2 \times 10^{-23}} \approx 6 \times 10^{23} \text{ mol}^{-1} :
 \end{aligned}$$

$$\begin{aligned}
 & \quad \quad \quad : \text{_____} \\
 & \quad \quad \quad 2 \times 10^{-23} \text{ g} \quad \quad \quad {}^{12}\text{C} \\
 & N_A = 6,02 \times 10^{23} \text{ mol}^{-1} \quad \quad \quad N_A = 6,02804531 \times 10^{23} \text{ mol}^{-1}
 \end{aligned}$$

: II _____

$$Z = 9 \quad : \quad \text{_____} \quad -1$$

$$^{19}\text{F}$$

$$^{19}\text{F}$$

$$m_1 = 19 \times 1,6 \times 10^{-27} \approx 3,17 \times 10^{-26} \text{ Kg}$$

$$(^{19}\text{F}) \quad 1 \quad \bullet$$

$$M_{19\text{F}} = m_1 \times N_A$$

$$= 3,17 \times 10^{-26} \times 6,02 \times 10^{23}$$

$$= 1,90 \times 10^{-2} \text{ Kg} \times \text{mol}^{-1}$$

$$= 19 \text{ g} \cdot \text{mol}^{-1}$$

$$M = A \text{ g} \cdot \text{mol}^{-1} \quad : \quad \text{_____}$$

$$(Z = 29) \quad) \quad ^{65}\text{Cu} \quad ^{63}\text{Cu} \quad : \quad \text{_____} \quad -2$$

$$\text{Cu}$$

$$.30,8 \% , 69,1 \% :$$

$$M_{1 \text{ } ^{63}\text{Cu}} = A_1 = 63 \text{ g} \times \text{mol}^{-1}$$

$$M_{2 \text{ } ^{65}\text{Cu}} = A_2 = 65 \text{ g} \times \text{mol}^{-1}$$

$$\text{Cu}$$

$$M = \frac{69,1}{100} \times M_1 + \frac{30,8}{100} \times M_2$$

$$= 63,5 \text{ g} \times \text{mol}^{-1}$$

$$(m=2\text{g}) \quad : \quad \text{II} \quad \text{_____}$$

$$: 01$$

$$01 \text{ mol } (^{56}\text{Fe}) \longrightarrow 56 \text{ g}$$

$$n \text{ mol} \longrightarrow 2 \text{ g}$$

$$n = \frac{2}{56} = 3,57 \times 10^{-2} \text{ mol}$$

$$9 \text{ g} \quad : 02$$

$$01 \text{ mol } (\text{H}_2\text{O}) \longrightarrow 18 \text{ g}$$

$$n \text{ mol} \longrightarrow 9 \text{ g}$$

$$n = \frac{9}{18} = 0,5 \text{ mol}$$

$$m \quad M \quad :$$

$$n = \frac{m}{M}$$

$$\rho = 0,79 \text{ g} \cdot \text{cm}^{-3} \quad \text{C}_2\text{H}_6\text{O} \quad : 03$$

$$n = \frac{V_{\text{gaz}}}{V_m}$$

$V_{\text{gaz}} : (P, T)$

11,2 L

$$n = \frac{V_{\text{gaz}}}{V_m} = \frac{11,2}{22,4} = 0,5 \text{ mol}$$

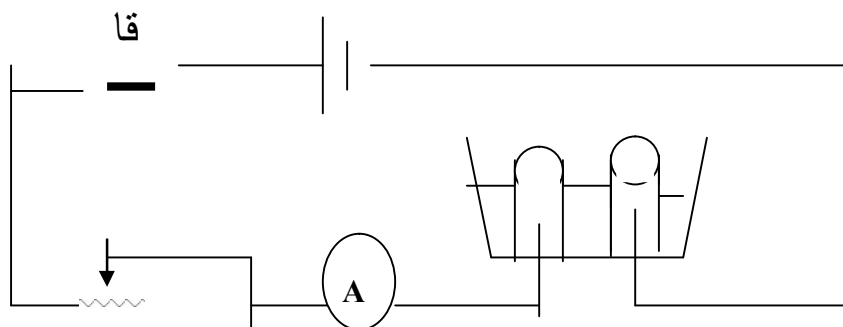
H_2

$$m = 0,5 \times 2 = 1 \text{ g} \leftarrow m = n \cdot M \leftarrow n = \frac{m}{M}$$

0.5 mol

0.5 mol

TP2 II



$$\Delta \quad Q = I \cdot t \quad I \quad V \quad (P, T) \quad \Delta \quad t$$

$$2H_2O + 2e^- \rightarrow H_2 + 2OH^- \quad (P, T)$$

.He, O₂, CO₂, C₄H₁₀ :



-1



-2

-3

$$Y_1 = \frac{V}{v}$$

(V=1.5L)

v

V

$$Y_2 = n \cdot N_A = \frac{m}{M} \cdot N_A$$

n

M

m

	He	O ₂	CO ₂	C ₄ H ₁₀
m (g)	2,1	0,25	3,6	2,8
M (g.mol ⁻¹)				
Y ₁				
v (m ³)	3,3 . 10 ⁻²⁹	3,7 . 10 ⁻²⁹	20,0 . 10 ⁻²⁹	7,1 . 10 ⁻²⁹
Y ₂				

-1

V_m

-2

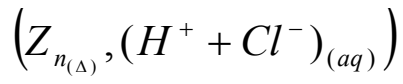
(D'après Guy Robardet- IUFM Grenoble.France)

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(P ,T)

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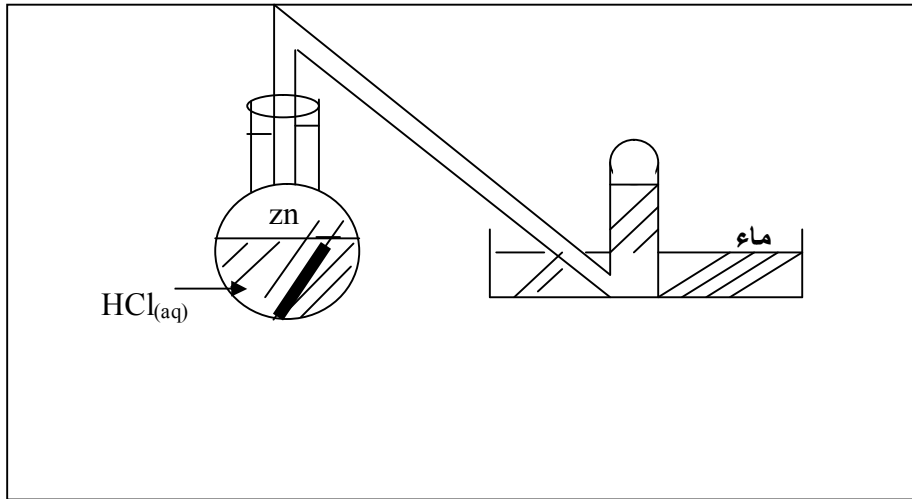


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.(1mol)

(P ,T)

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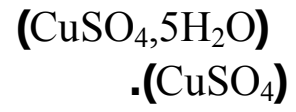
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$C_{\text{molaire}} = \frac{n}{V}$: _____

$C_{\text{massique}} = \frac{m}{V}$: _____

- :TP3 II _____

NaOH

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*

/A
-1

:

Ca	O	H	C	Cl	Na	Cu	Pb	
								M (g.mol ⁻¹)

C ₁₂ H ₁₂ O ₁₁	CaCO ₃	NaCl	
			M

M () d ρ -3
-4

_____ / B
: (épreuve) :

0.5 mol -1
0.8 mol -2

(TP 3 + 10) _____ :III

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:

P -

T -

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.($n_{O_2} = 1 \text{ mol}$ $n_{H_2} = 3 \text{ mol}$

-3 _____ :

) x

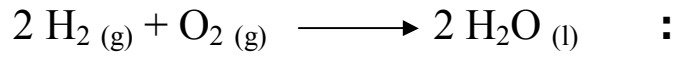
" IUAPC "

:

(mol

O₂

H₂



:

x	H ₂ O	* O ₂	H ₂	
/	2	1	2	
/	4	2	4	
/	6	4	6	3
	.	.	.	.
x = 1 mol	4 N _A (4 mol)	4 N _A (4 mol)	2 N _A (2 mol)	N _A
x = 2 mol	4 N _A (4 mol)	2 N _A (2 mol)	4 N _A (4 mol)	2 N _A
x = 3 mol	/	/	/	3 N _A
x = 4 mol	/	/	/	4 N _A

(mol)

x

[

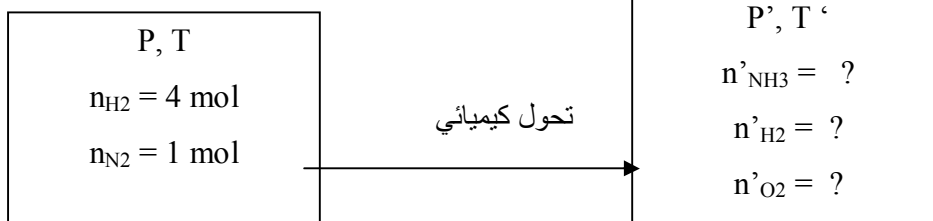
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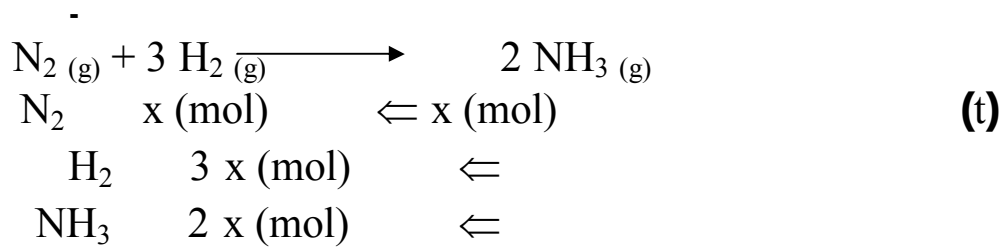
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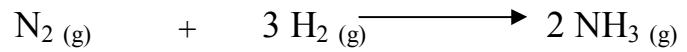
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معادلة التفاعل



	x (mol)	n _{N2}	n _{H2}	n _{NH3}
E I à t = 0	0	1	4	0
E Int à t	x	1-x	4-3x	2x
E F à tf	x _f = x _{max}			

$$1-x = 0 \Rightarrow x = 1 \text{ mol}$$

$$4-3x = 0 \Rightarrow x = 4/3 = 1,33 \text{ mol}$$

$$x_{\text{max}} = 1 \text{ mol}$$

:"

$$\begin{array}{l}
 x_{\text{max}} = x_f = 1 \text{ mol} \Leftarrow (\quad) \\
 : \quad (\quad = \quad)
 \end{array}$$

	n _{N2}	n _{H2}	n _{NH3}
x _{max} = x _f = 1 mol	0	2 mol	2 mol

P', T '

$$n_{\text{NH}_3} = 2 x_{\text{max}} = 2 \text{ mol}$$

$$n_{\text{H}_2} = 2 \text{ mol}$$

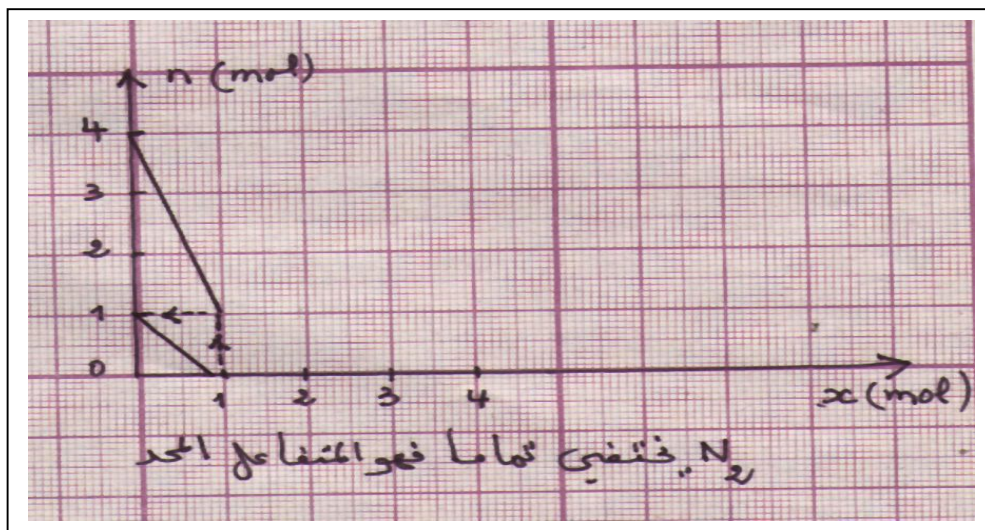
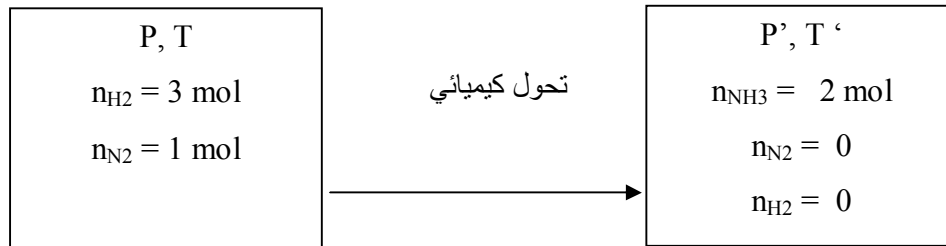
$$n_{\text{N}_2} = 0$$

)

$$x_{\max} = x_f = 1 \text{ mol}$$

$$: \text{_____}$$

$$(n_{\text{N}_2} = 1 \text{ mol} \quad n_{\text{H}_2} = 3 \text{ mol})$$

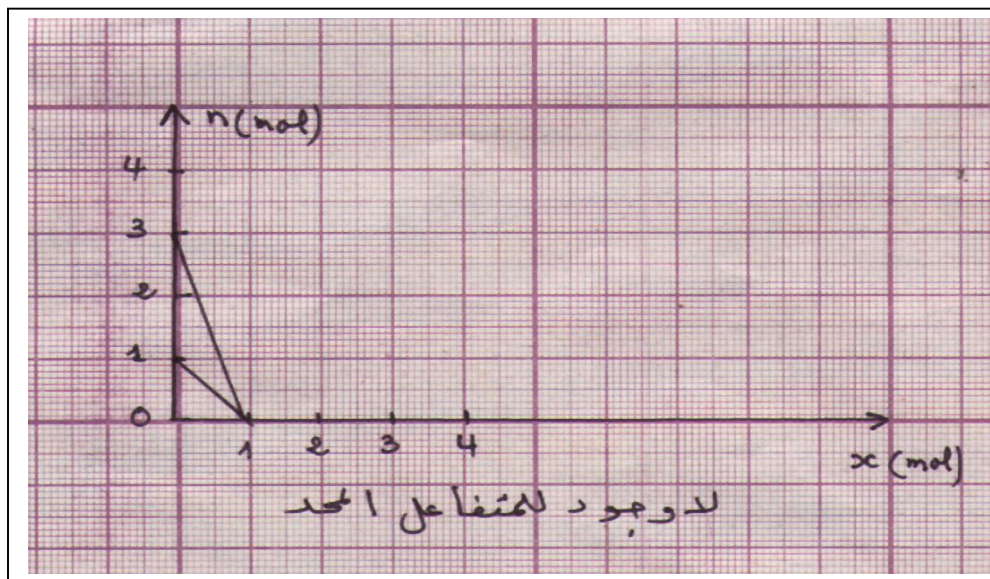


$$\underline{n = f(x)} \quad -5$$

$$x \quad ()$$

$$n_{\text{N}_2} = 1 - x = f(x)$$

$$n_{\text{H}_2} = 4 - 3x = g(x)$$

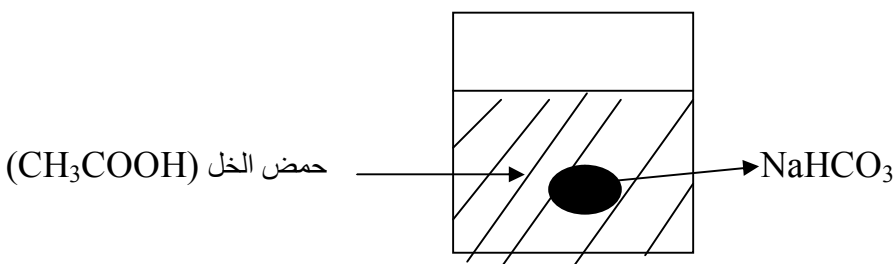


III	()	2
1TP III	⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮ ⋮	2
III	" "	1
III	⋮ 1TP III ()	2
III	1TP III $n = f(x)$	1
2TP III		2
III	⋮ _____	2
3TP III		2
III		2

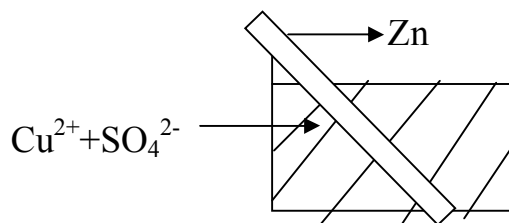
⋮
النشاط III : وصف جملة كيميائية

⋮

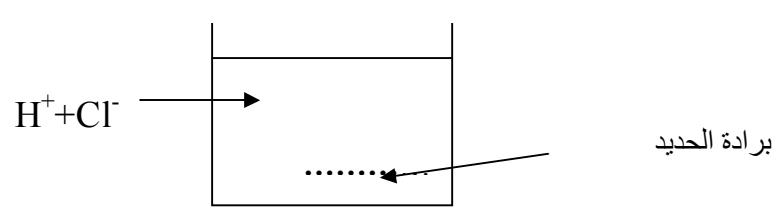
⋮ 1



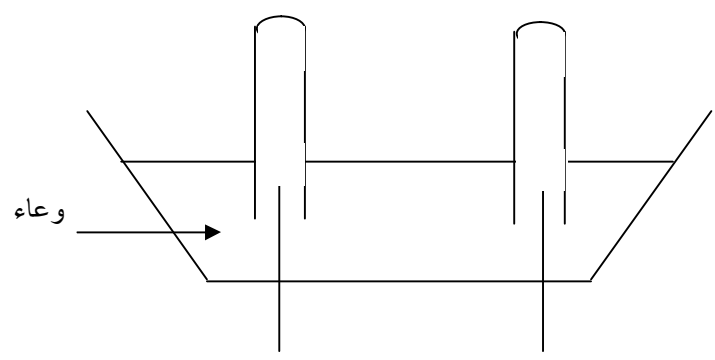
جملة 2 : محلول كبريتات النحاس وتوتياء



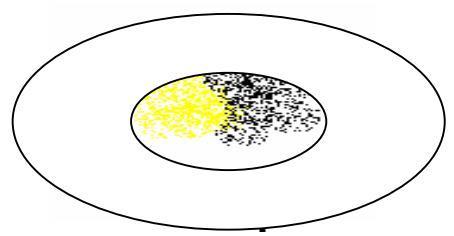
: 3



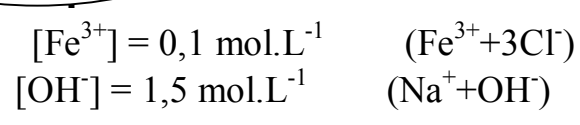
+ : 4



: 5



TP1 III



(300 mL) 03 :
- :
-
-

50 mL

15 mL, 10 mL, 5 mL

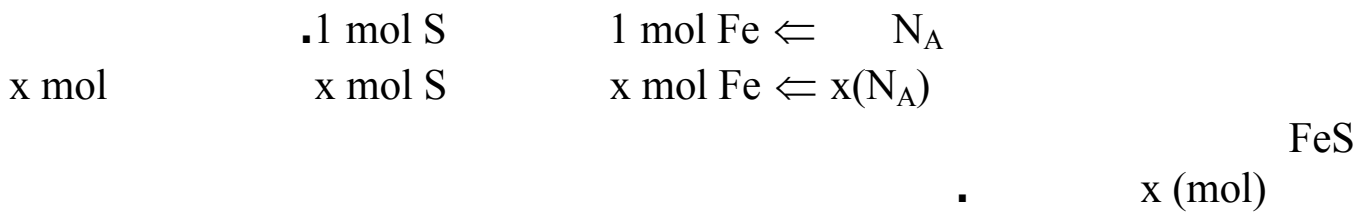
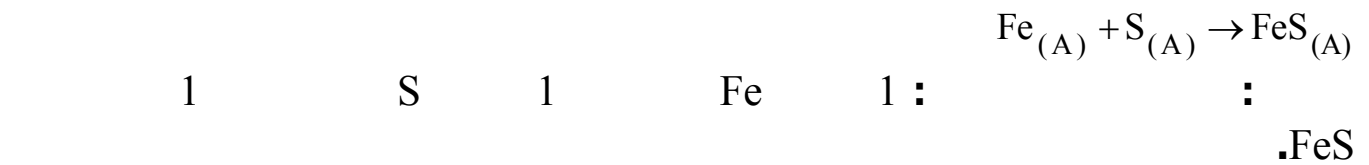
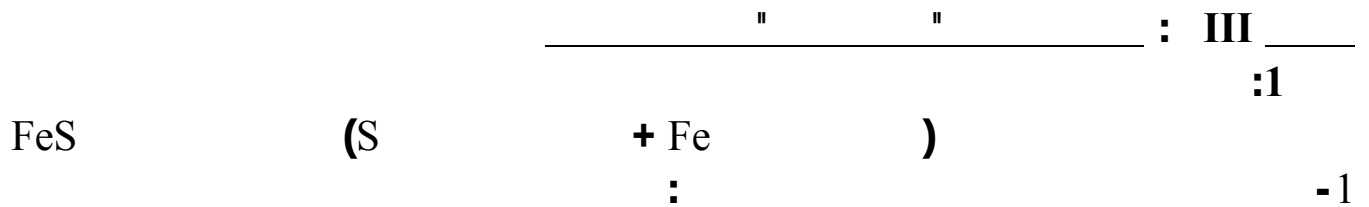
: -1

	$Na^+ + OH^-$	$Fe^{3+} + 3Cl^-$	
	5	50	1
	10	50	2
	15	50	3

$$(n_{OH^-} - n_{Fe^{+3}}) \quad -2$$

$$\quad -3$$

$$\quad -4$$



:2

	n'_0	n_0		
		Fe + S	$\longrightarrow$	FeS
		x		
(t=0)	0	n_0	n'_0	0
(t)	x	$n_0 - x$	$n'_0 - x$	X
t_f	x_f	$n_0 - x_f$	$n'_0 - x_f$	X

$$x_f = x_{\max} \Leftarrow (\quad)$$

$\Leftarrow$

S, Fe

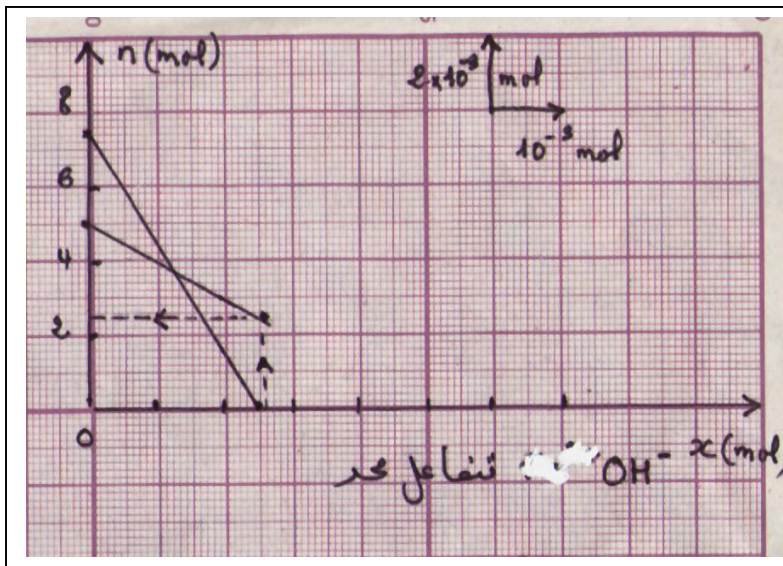
x :

	$\text{Fe}^{+3} + 3\text{OH}^- \rightarrow \text{Fe}(\text{OH})_3$		
	$5 \cdot 10^{-3}$	n_{OH^-}	0
	$5 \cdot 10^{-3} - x$	$n_{\text{OH}^-} - 3x$	X
	$5 \cdot 10^{-3} - x_f$	$n_{\text{OH}^-} - 3x_f$	x_f

: 2

()

TP1 III

 $\text{Fe}(\text{OH})_3$ 

$$n = f(x)$$

: III _____

:1

$$n_{\text{OH}^-} = g(x) \quad n_{\text{Fe}^{3+}} = f(x)$$

: III

:

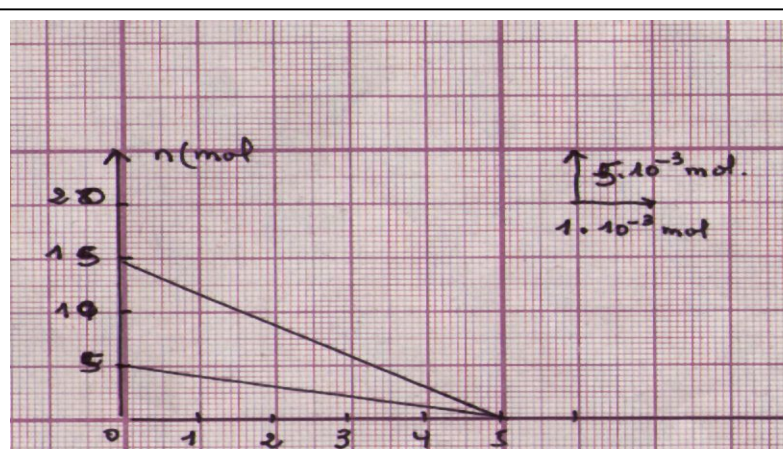
$$n_{\text{Fe}^{3+}} = n_{0\text{Fe}^{3+}} - x = 5 \cdot 10^{-3} - x$$

$$n_{\text{OH}^-} = n_{0\text{OH}^-} - 3x = 7,5 \cdot 10^{-3} - 3x$$

:

$$n_{\text{Fe}^{3+}} = 5 \cdot 10^{-3} - x$$

$$n_{\text{OH}^-} = 15 \cdot 10^{-3} - 3x$$



-5

-6

-7

-8

-9

()
P = 1,0 bar T = 25°C
[Fe²⁺]

M_{Fe} = 56 g.mol⁻¹ :

: III

(Cu²⁺+SO₄²⁻) II

50 mL

:

m = 10 g

-1

-2

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Al³⁺

n_{Cu2+}

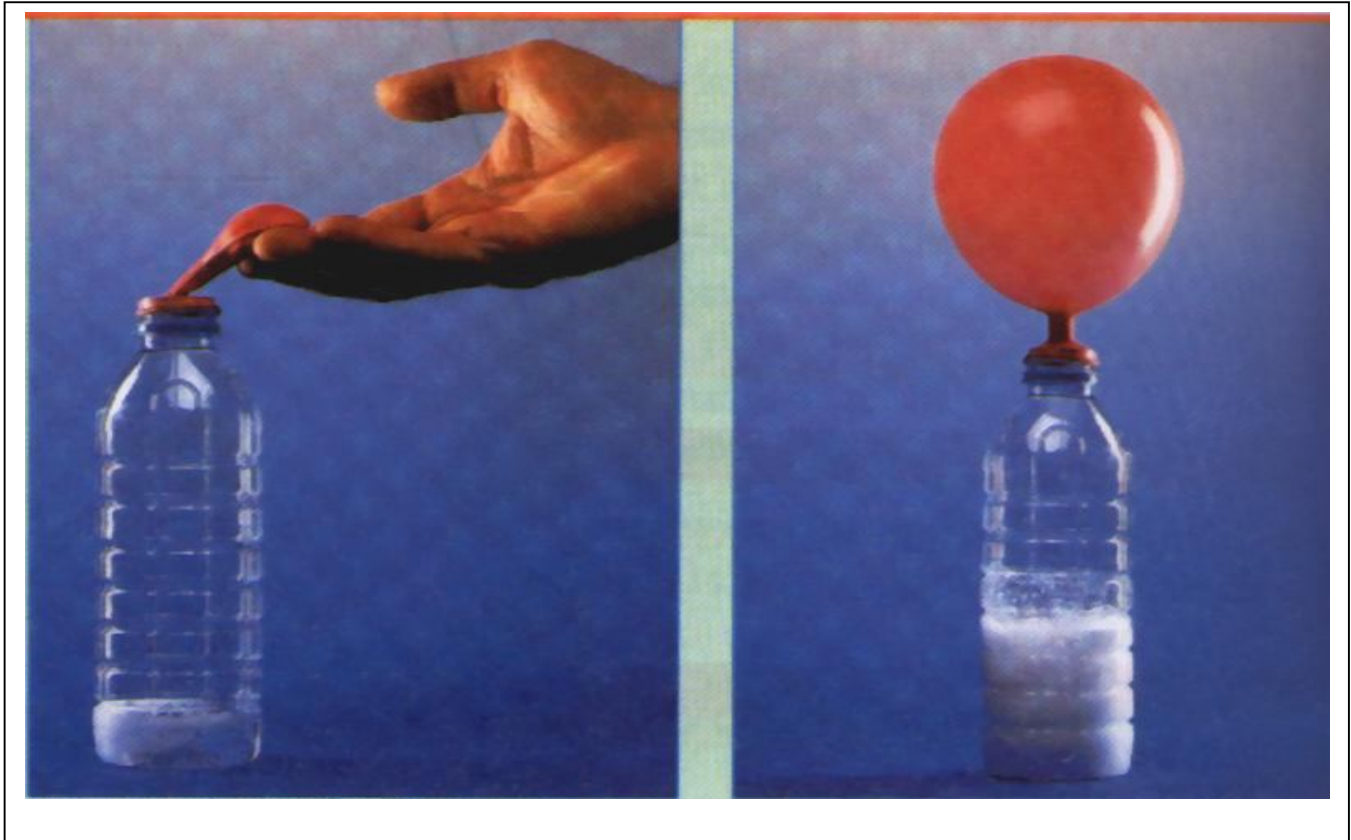
-5

-6

M_{Fe} = 56 g.mol⁻¹ :

3TPIII

5,04 g] 6° 80 mL
 .[(AH) CH₃COOH
 (NaHCO₃)



:
 . AH 6 g 100 mL 6°
 : III
 [Cu²⁺] = 0,10 mol.l⁻¹ (II) 100 ml
 .2,0 g
 .
 .
 Fe²⁺
 .
 :
 M_{Cu} = 63,5 g.mol⁻¹
 M_{Fe} = 56 g.mol⁻¹

- 1
- 2
- 3
- 4
- 5
- 6

Glossaire :

Espèce Chimique :

(-)

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Elément Chimique :

Z X

Mole :

$^{12}_6\text{C}$

12

Masse Molaire Atomique :

^A_ZX

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Système Chimique :

(n, T, P)

Transformation Chimique :

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Avancement de la réaction :

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Avancement Maximal :

Avancement final : -

.(Réactif limitant : -

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2007 - 2006 2006 – 2005

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2006 – 2005 :

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16 + 24 : -1

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$\vec{\Delta V}$

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ظهور التصور الميكانيكي

الوثيقة – أ-

مدخل إلى مفهوم القوة

الوثيقة "ب"

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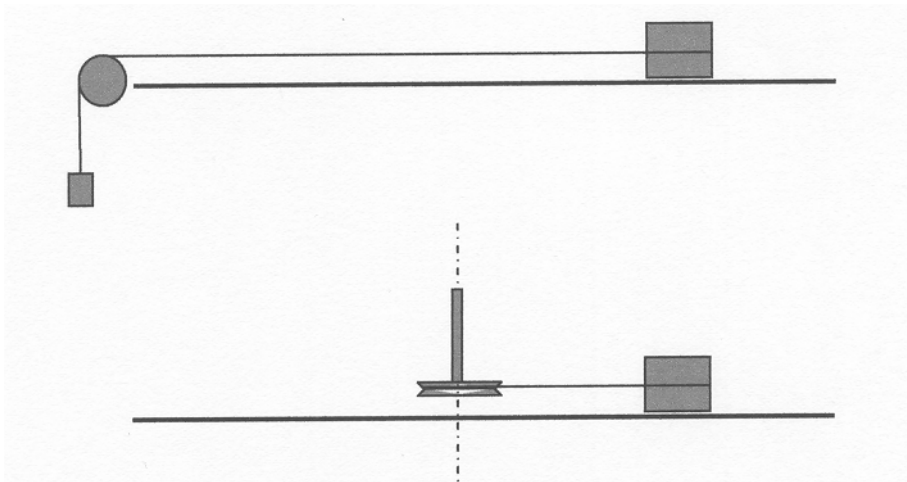
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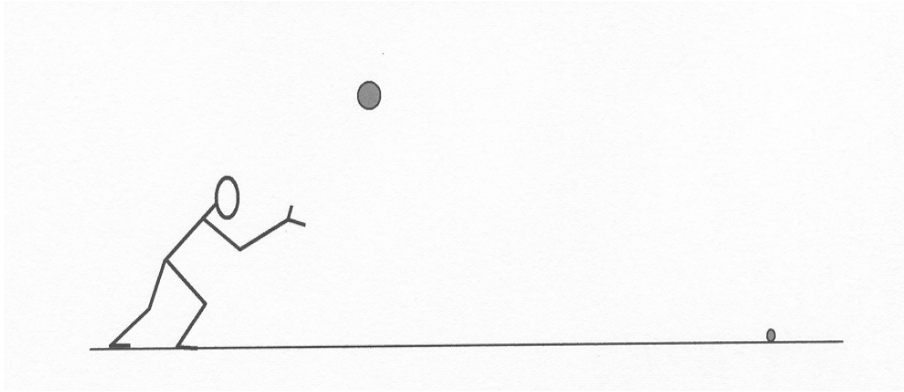
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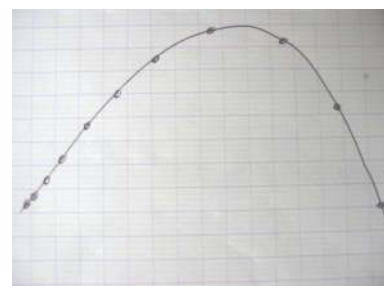
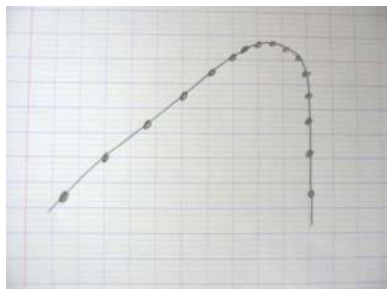
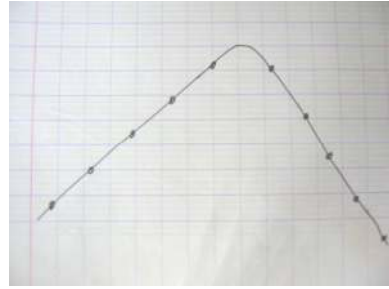
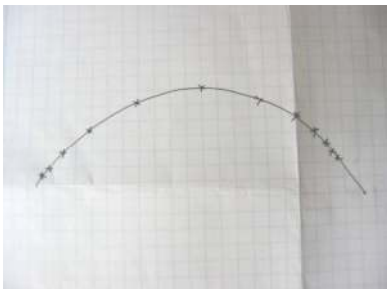
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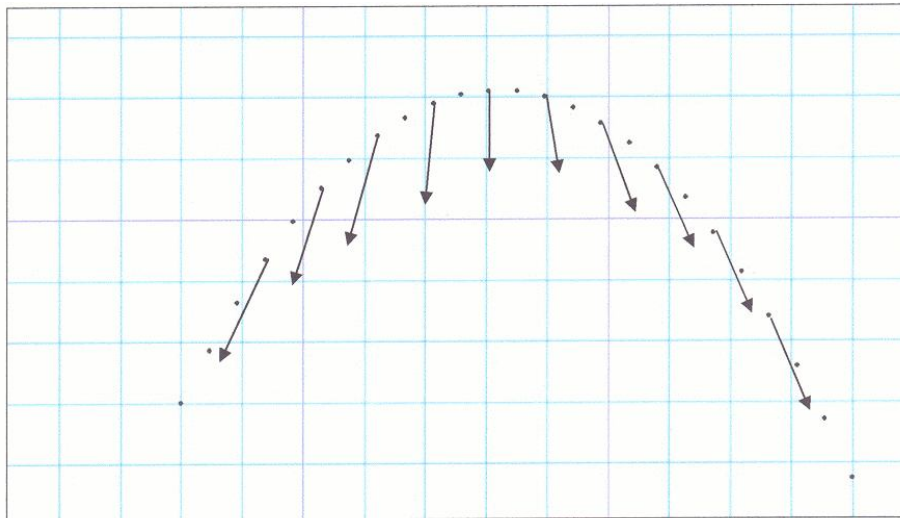
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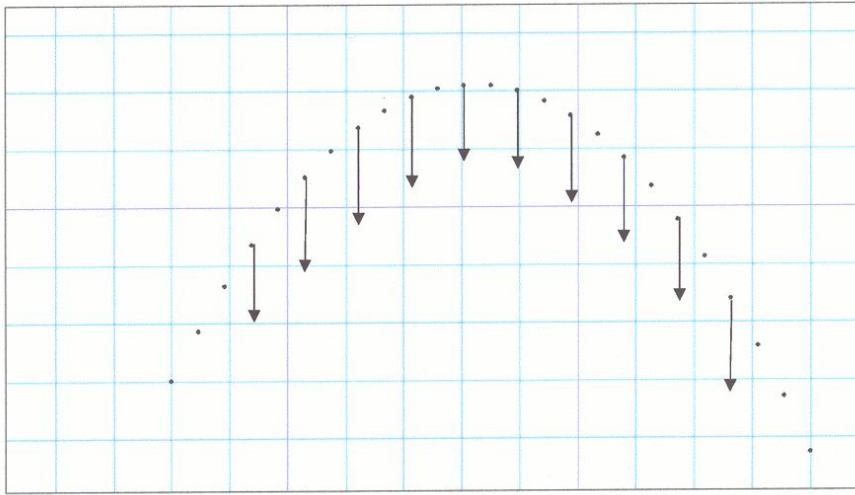
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$$\vec{F}_{T/s}$$

"satellites"

- -

6400 km

5.9×10^{24} kg

$$\frac{1}{100} \tau$$

"satellites"

10 000 s

$$) 100 \text{ s} = \tau$$

.(3

1000 km

-1

-2

$$\cdot 4000 \frac{m}{s} \quad 3000 \frac{m}{s} \quad 2000 \frac{m}{s} :$$

-3

$$8000 \frac{m}{s}$$

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-1

2000 km

$$\left(\begin{array}{c} \tau \end{array} \right)$$

-2

$$\left(\begin{array}{c} 0.5500 \\ 3500 \end{array} \right) \frac{m}{s}$$

-3

-4

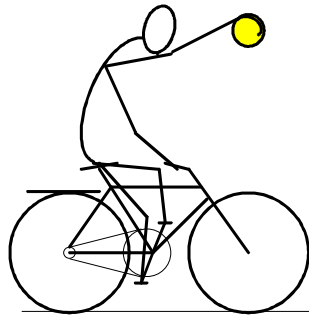
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- 380 000 km

:3

$$\begin{array}{c} (\quad) \\ - \quad - \quad (\quad) \\ \quad \quad \quad \quad) \\ \quad \quad \quad \quad . (\\ \quad \quad \quad \quad : \\ (\quad) \end{array}$$

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Avistep

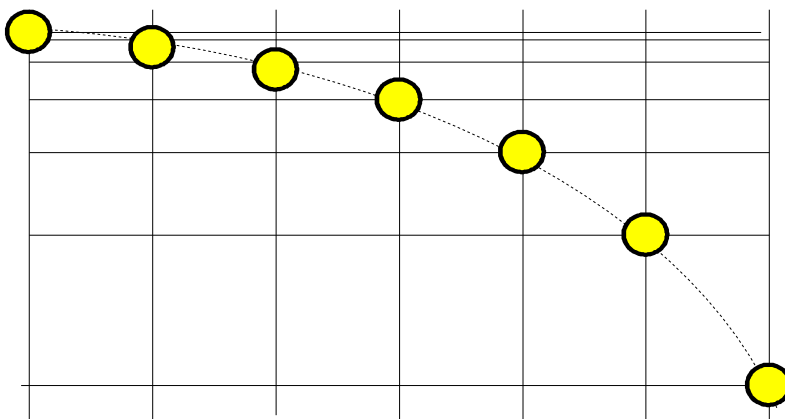


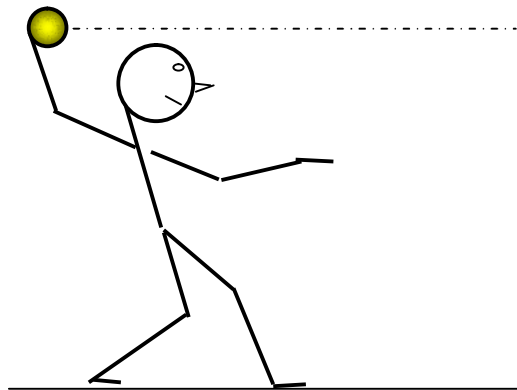
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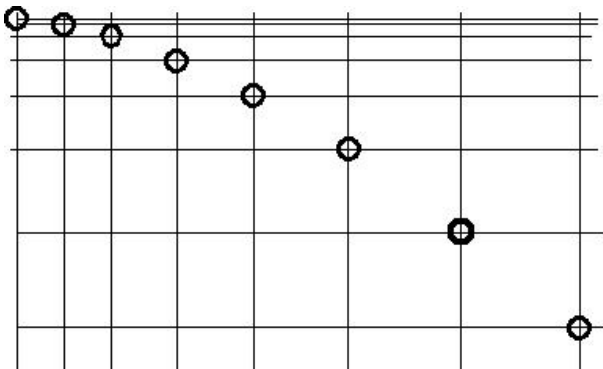




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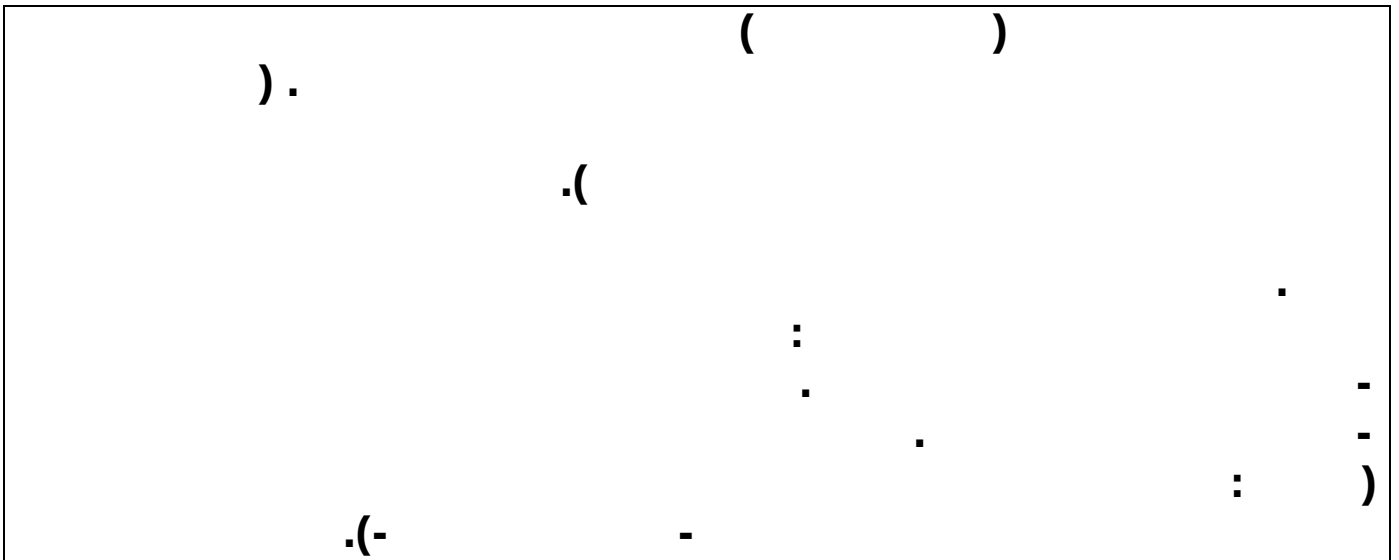


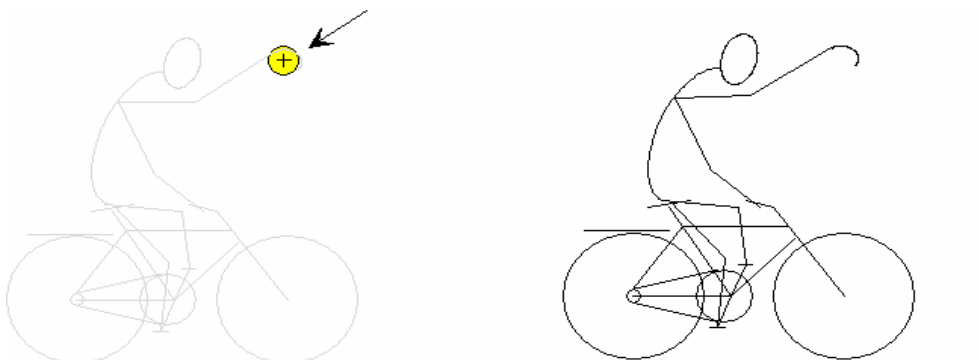
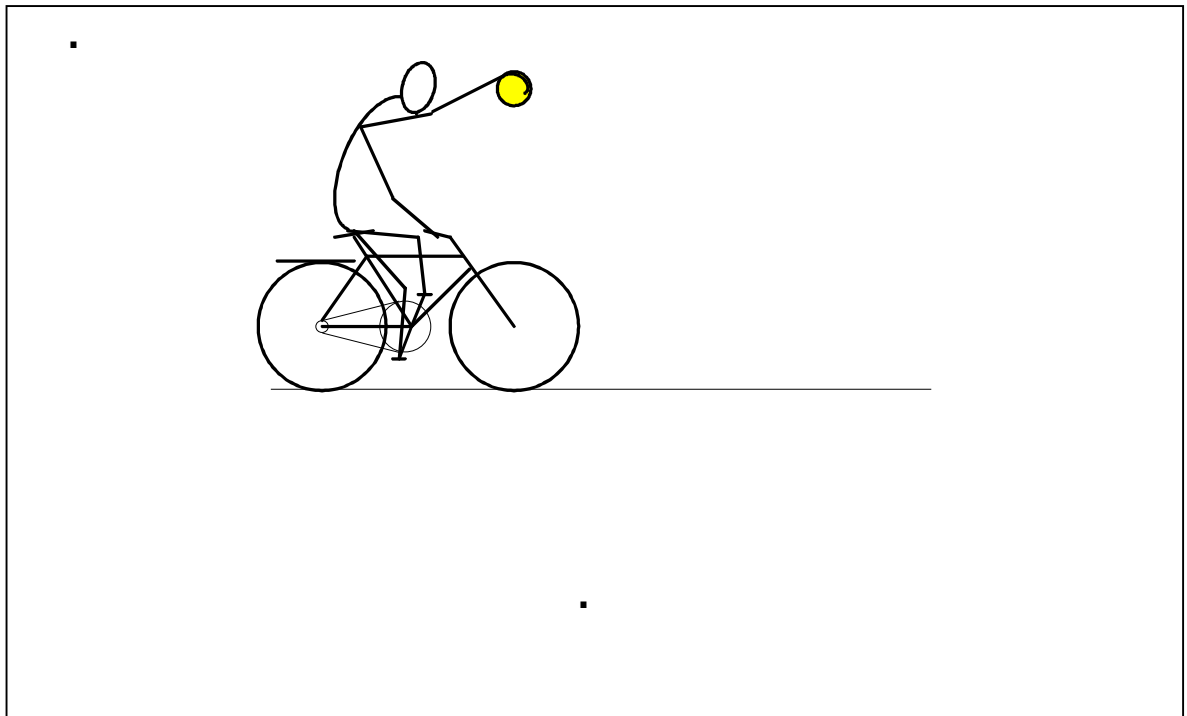
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$\vec{V}_0$

$\vec{V}_0$

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(adhérence)

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($\Delta \vec{v}$ $\vec{F}$)

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.(A)

(B)

(B)

(A)

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▪ “ $\vec{F}_{A/B} = -\vec{F}_{B/A}$ ”

(30):

⋮

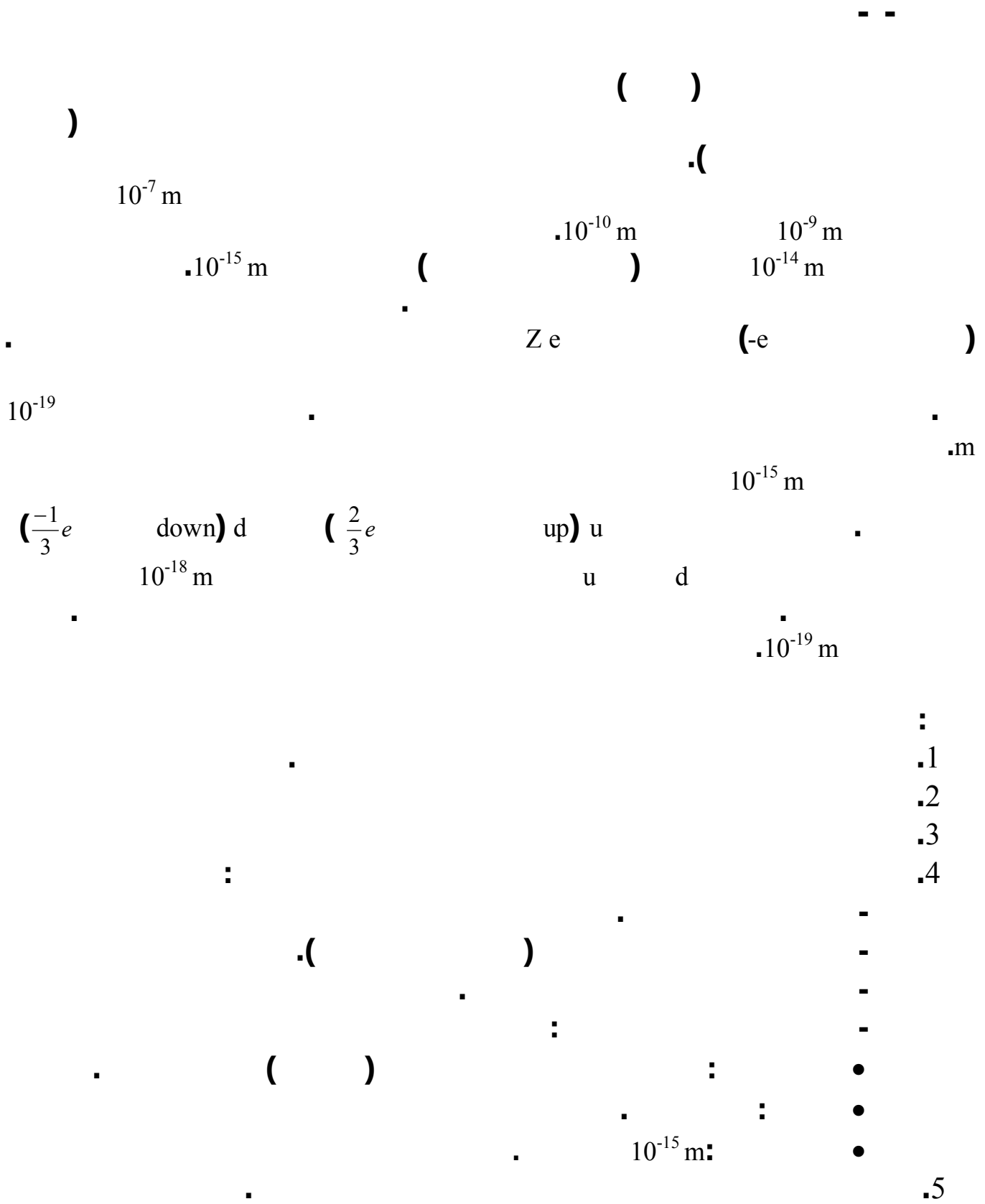
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... 4 + ... 6 : ... - 2

قلم الجزائر | WWW.DZPEN.COM



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(...)

$$(- \quad - \quad)_+$$

$$m_2 \quad m_1$$

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G

d

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1797)

(1731-1810)

(1798

□

□

()

5cm

1.80m

■

160 kg

G

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.(5.52) 5.48

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$$(- \quad -)$$

1

الفعل المتبادل القوي

الوثيقة -ج-

()

()
()

!

:

(Hideki YUKAWA)

1935

()
()

.

(

1960

()

(Murray GELL-MANN)

(Quarks)

1964

(George ZWEIG)

.

1970

(Gluons)

(Modèle Standard)

. 1995

:

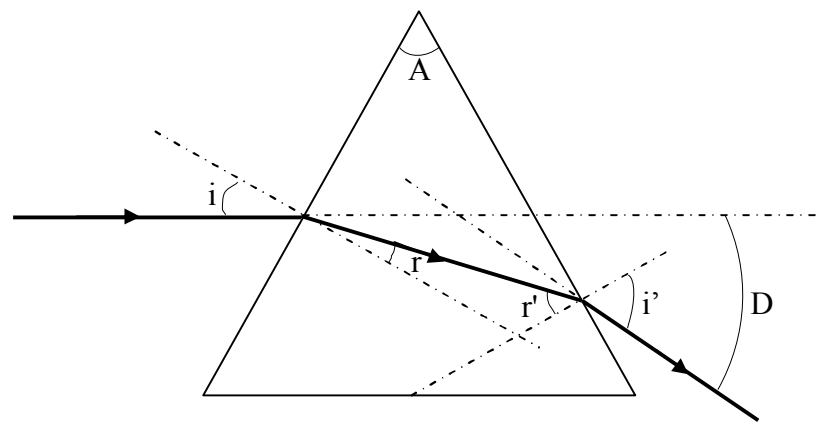
()



... 10 + . 18

-		() 2	-1
-	:	(1+1)	
- -			
	:	1	
///	:	() 2	
	:	(1+1)	-2
- -	:		
	:	1	
	:	() 2	
- -	:	(1+1)	-3
	:	1	
///	:	() 2	
	:		
- -	() :	(1+1)	
	:	1	
- -	:	() 2	
	()	(1+1)	
		1	

$$\begin{aligned} \sin i &= \sin r \\ r + r' &= A \\ \sin i' &= n \sin r' \\ D &= i + i' - A \\ n &= \frac{\sin \frac{Dm + A}{2}}{\sin \frac{A}{2}} \end{aligned}$$



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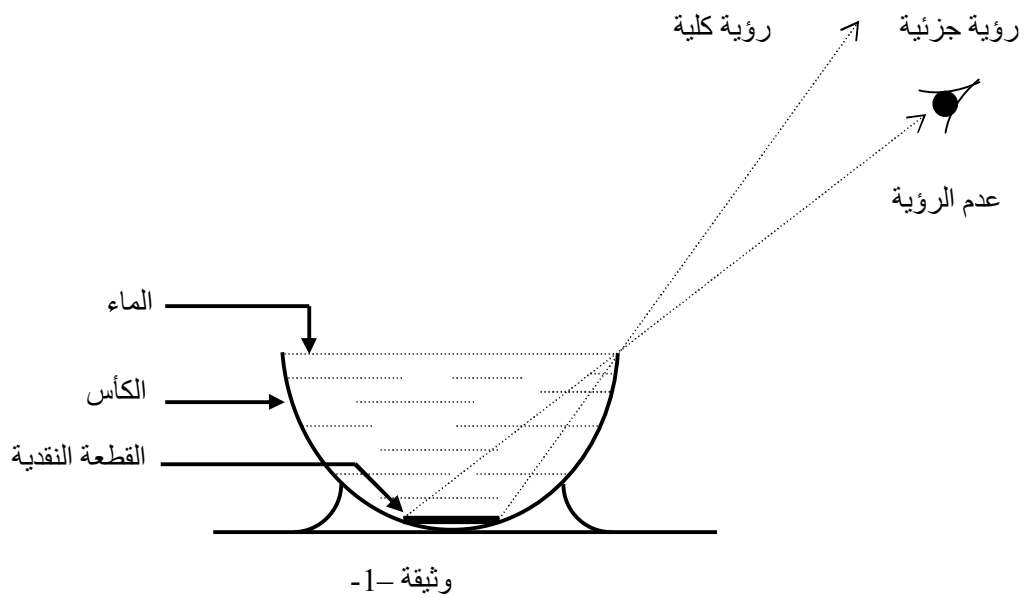
()

.

(5-4)

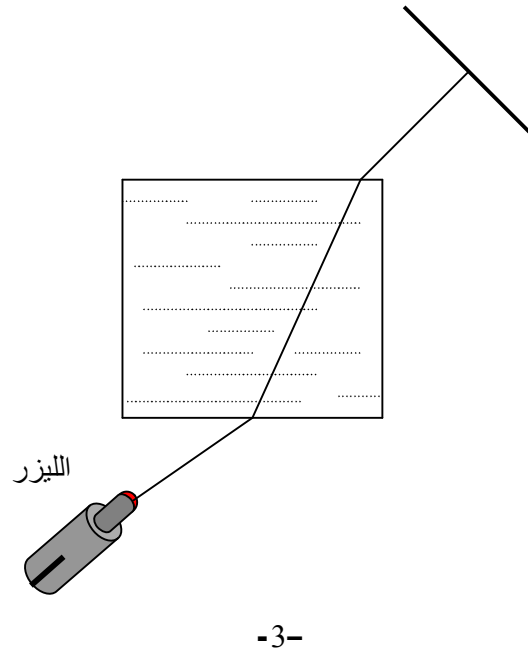
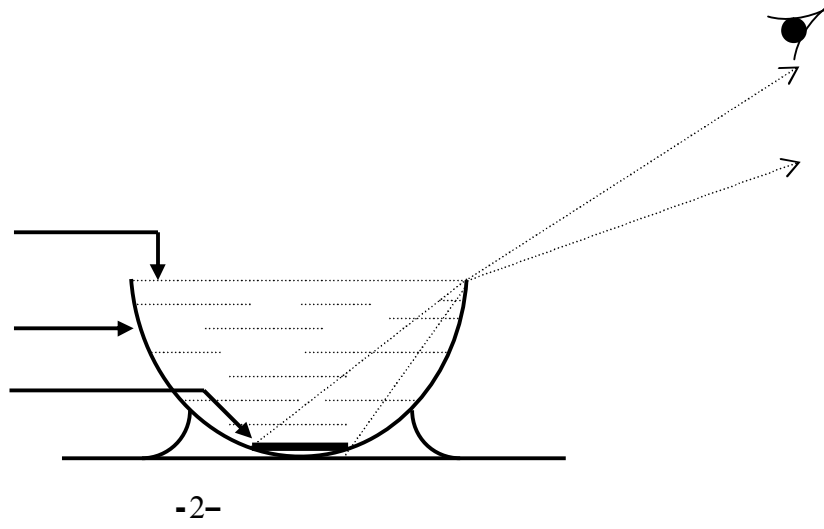
-1
-2

-1-

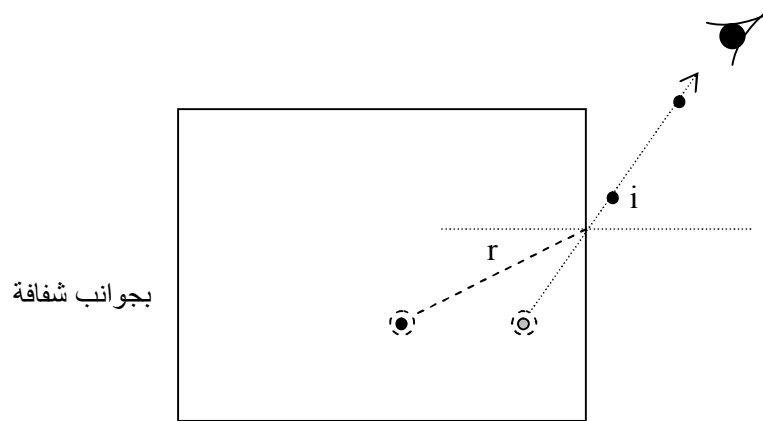


-2-

()



- 4 -



-4-

:(i)

.(i)

)

.

sin r

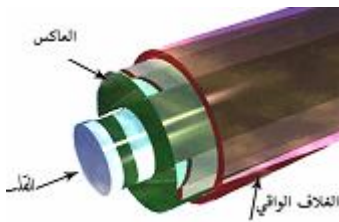
sin i

(r)

(i

...!

$$(n_c > n_g)$$

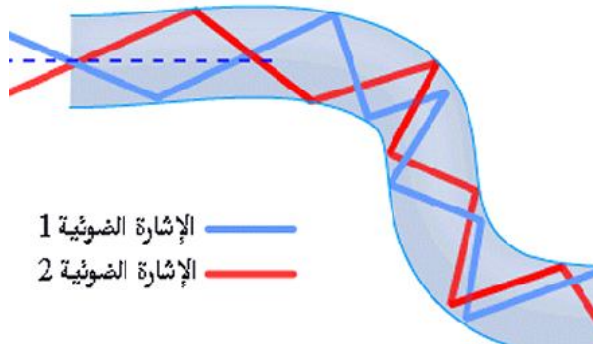


-1

9 micron

-2

62.5 micron



-1 () :

-2 :

-3 :

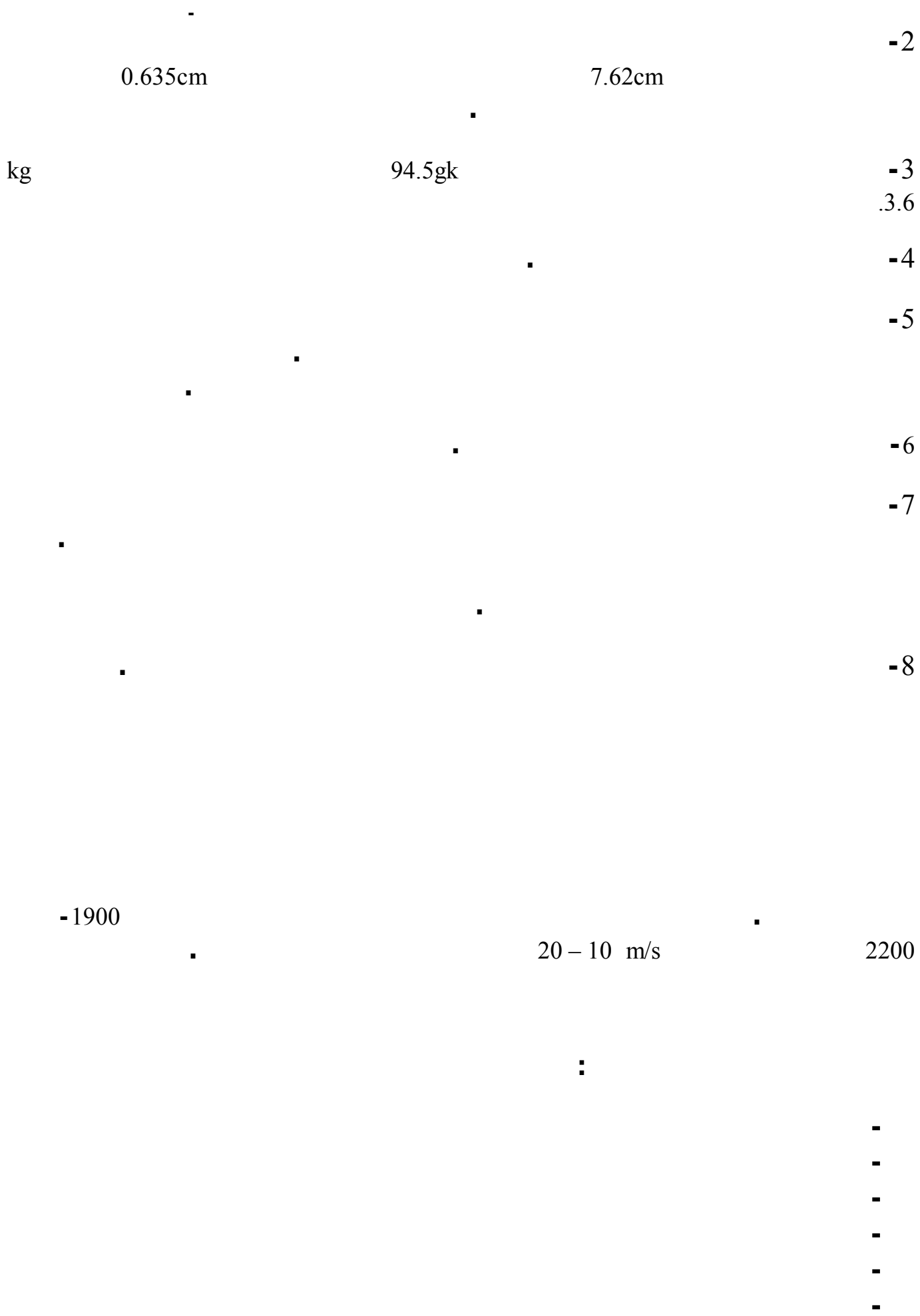
:

:

-1

.6Mhz

50THZ



:2

(- -)

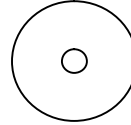
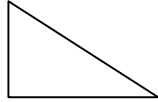
” ” ” ” - -

الوثيقة – ج- **الضوء الأبيض والضوء الوحيد اللون**

-1
-2

:
(5) :

CD



:

:

-3

-2

-1

:

-1

-2

-3

-4

-5

:

(15+15) :

()

(10) :

)

.(

(5) :

()

(5) :

(10) :

-1
 -2
 ()
 ()
 (10) :
 (5) :
 ()
 :
 (λ)
 (m)

3:

في حصة الأعمال المخبرية، تنجز تجارب للتعرف على ألوان اللهب لبعض العناصر الكيميائية
 (الصوديوم، البوتاسيوم، النحاس) ثم يشاهد طيف الإصدار الموافق لكل عنصر، بواسطة المطياف.

(- -)
 (- -)
 ()

() - -

-1
 :
 (...) :
 1666
 (...)
 ...

.()

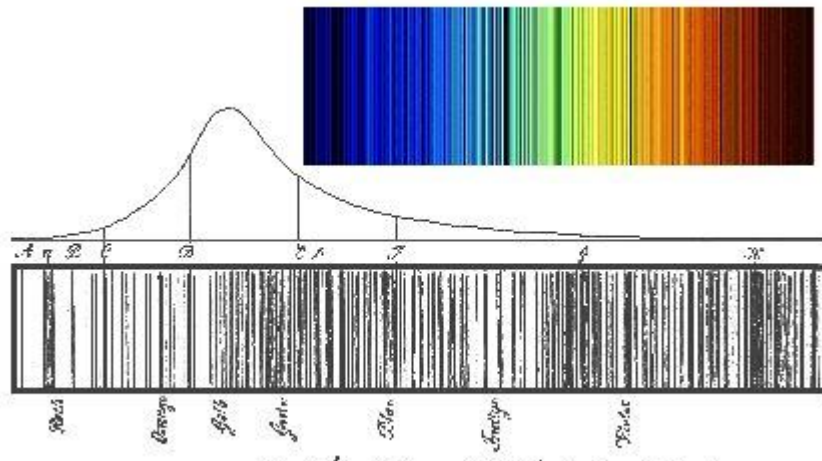
-2

1802

William Wollaston

1811

600



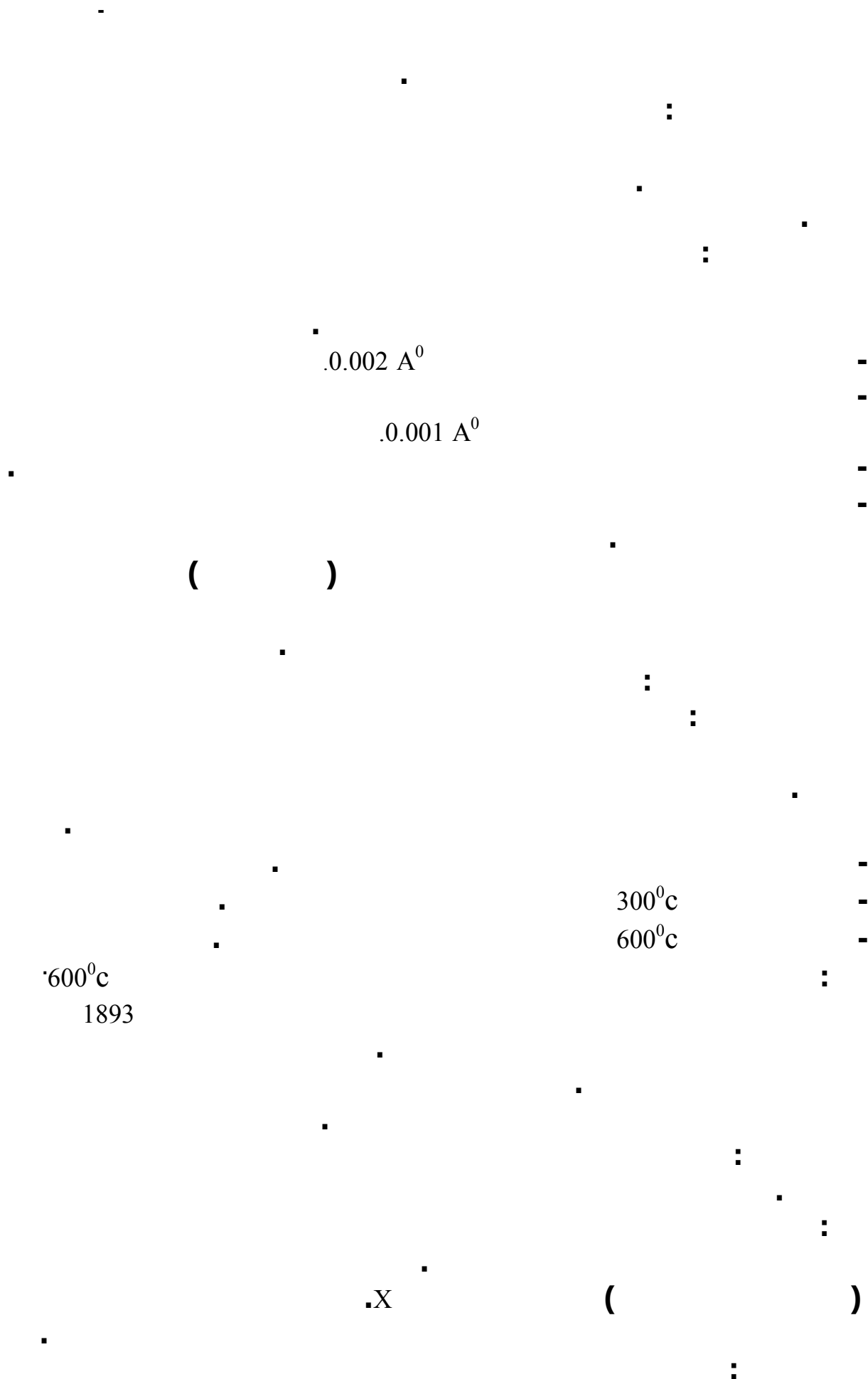
1817

600

2600

(1887-1824)

()



1814

Joseph Von

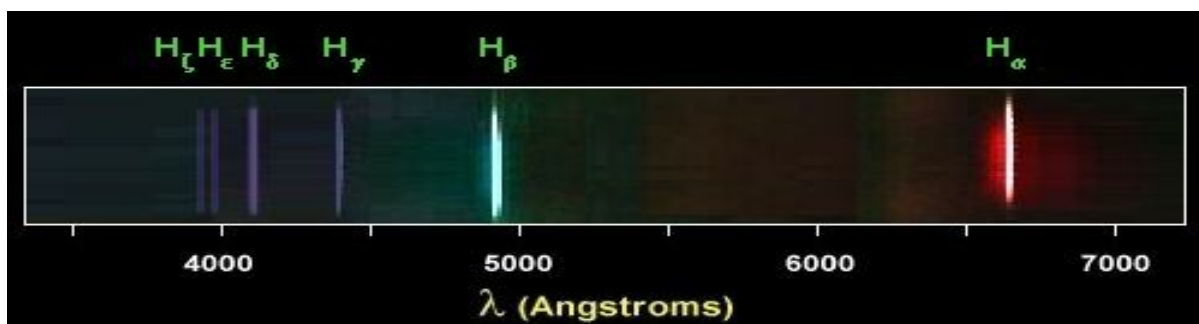
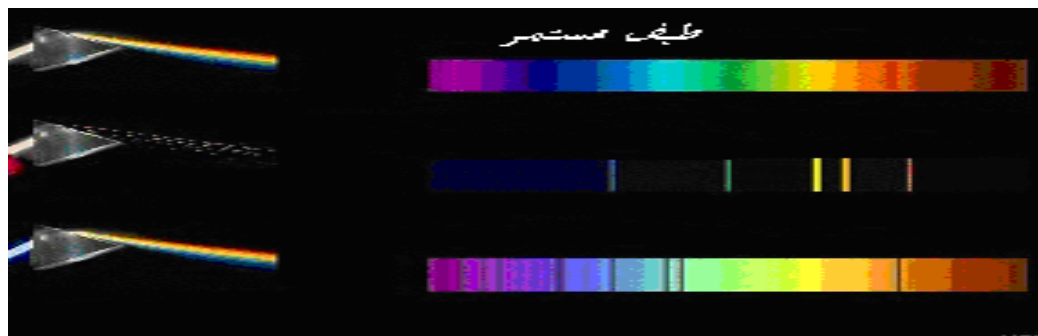
Fraunhofer

Robert Bunsen

(

)

Gustav Kirchhoff



.(1814) (J.FRAUNKOFER)

:3

:4

(HERTZ-RU)

.FRAUNHOFER

:

-1

FRAUNHOFER

-2

-3

.(

:2

()

(2)

B

:

(K H)

H_{δ} H_{γ} H_{β} H_{α}

:1

h

(404 406 407 438 440 442 527 E=630)

.(...Ca bbb = Mg , DD = Na)

G

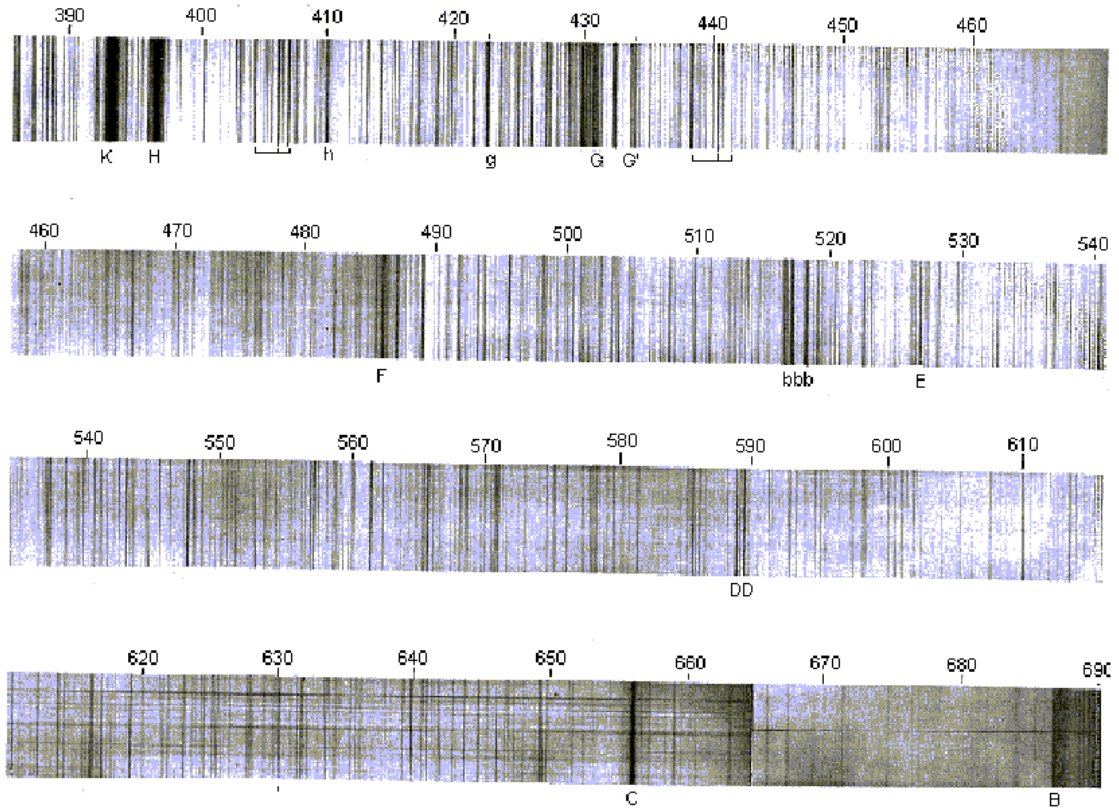
6000K°

.()1

:2

B

() 1



-2-

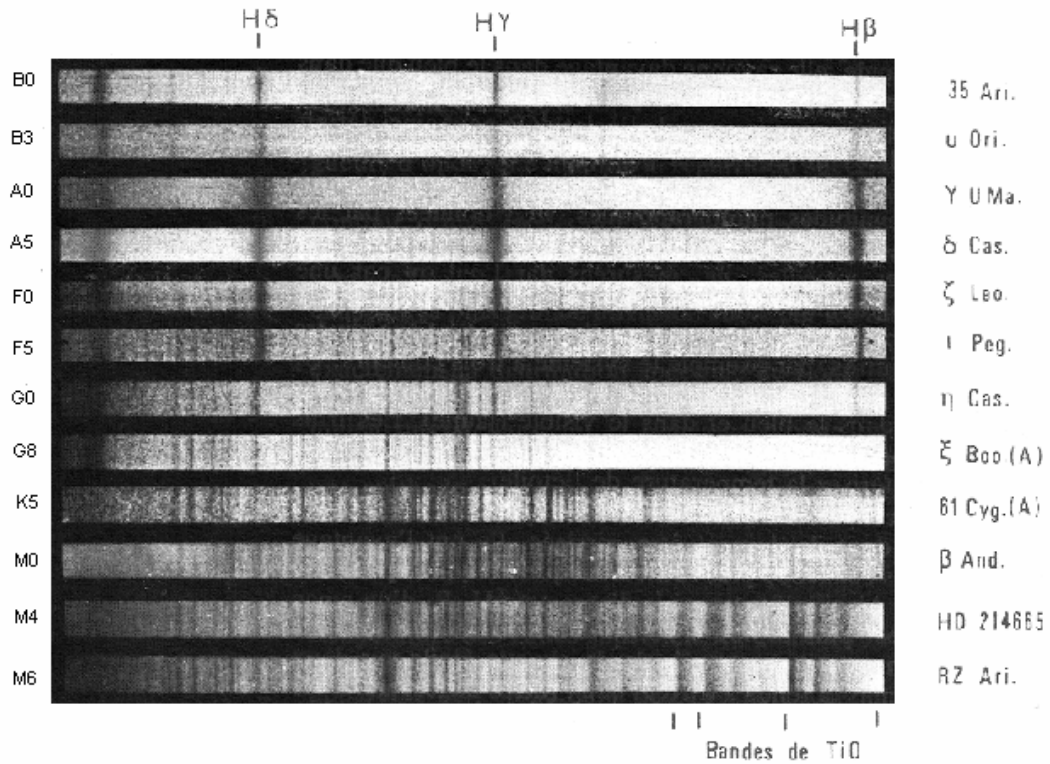
λ (nm)		
388.9		** He+
393.4	U. Violet	** Ca+
396.8	U. Violet	* Ca+
403.1	Violet	** Mn
404.0	Violet	Fe
404.4	Violet	* K
404.6	Violet	Hg

λ (nm)		
516.8		Fe
517.2	Vert	Mg
518.4	Vert	** Mg
521.8	Vert	* Cu
527.0	Vert	Fe
540.0	Vert	Ne
546.1	Vert	* Hg

404.7	Violet	K	553.5	Vert	** Ba
406.0	Violet	Fe	567.9	Vert	** N+
407.6	Violet	Fe	570.0	Vert	** Cu
407.8	Violet	** Sr+	577.0		** Hg
409.9		* N	577.8	Jaune	* Ba
410.2	Violet	Hδ	578.2	Jaune	K
410.9	Violet	* N	579.1	Jaune	** Hg
422.7	Violet	Ca	580.2	Jaune	K
424.0	Violet	N+	583.2	Jaune	K
425.4	Indigo	** Cr	583.2	Jaune	Ne
427.5	Indigo	* Cr	585.2	Jaune	* Ne
429.0	Indigo	* Cr	585.7	Jaune	* Ca
430.8	Indigo	Fe	587.6		* He
434.0	Indigo	Hγ	588.9	Orange	** Na
435.8	Indigo	* Hg	589.5	Orange	* Na
437.6	Indigo	Fe	610.3	Orange	* Li
440.0	Indigo	Fe	612.2	Orange	Ca
442.7		Fe	614.2	Orange	* Ba+
444.0	Indigo	N+	616.2	Orange	Ca
445.5	Indigo	Ca	630.0	Orange	Fe+
447.1	Indigo	He	636.2	Orange	** Zn
455.4	Indigo	** Ba+	640.2	Orange	** Ne
455.5	Indigo	* Cs	640.8		Sr
460.7	Indigo	** Sr	643.8	Rouge	** Cd
465.0	Indigo	N+	643.9	Rouge	Ca
468.0		Zn	646.2	Rouge	* Ca
468.5	Bleu	He+	656.3	Rouge	H _α
472.2	Bleu	Zn	667.8	Rouge	He
480.0	Bleu	** Cd	670.8	Rouge	** Li
481.0	Bleu	Zn	671.8	Rouge	Ca
486.1	Bleu	Hβ	691.1	Rouge	K
492.2		He	693.9	Rouge	** K
493.4	Vert	Ba+	706.5		He
497.0	Vert	* Li	714.8	I Rouge	Ca
500.0	Vert	He	732.6	I Rouge	Ca
500.0	Vert	N+	766.5	I Rouge	** K
501.6	Vert	He	769.9	I Rouge	* K
510.5	Vert	* Cu	852.1	I Rouge	** Cs
515.3	Vert	* Cu	894.3	I Rouge	Cs
516.7	Vert	Mg			

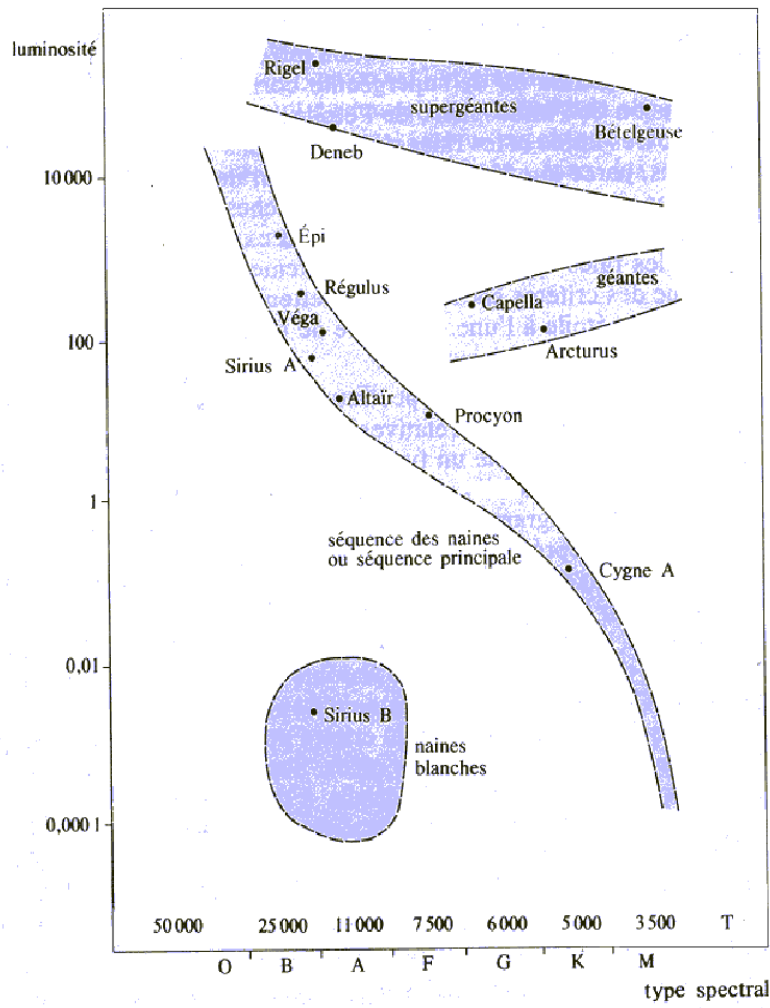
*

**



:

	O
.0 B3 B0 : Mg+	B
A5 A0 : Ca++	A
F5 F0 :	F
G8 G0 :	G
. K5 :	K
: . TiO M0 M4 M6	M



ملاحظة: يمكن للأستاذ أن يستغل كذلك الوثيقة المرافقة لمجال الضوء في الجذع المشترك آداب وعلوم انسانية.

(Webcam)



-I

-1

-

-2

(Résolution)

-

.320X240 :

-3

-

-4

-

-5

-

-II

()

-

-

-

-III

-1

-

-2

-

-

)

.(Caméscope numérique)

.(Caméscope analogique)

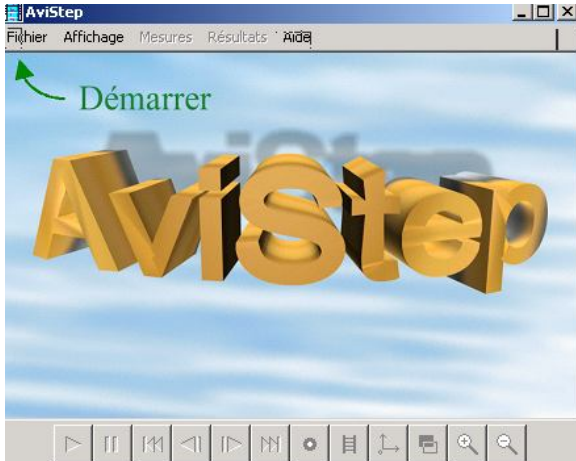
.(Interface)

(Graphics Interchange Format) GIF (Vidéo pour Windows) AVI .
(Web Cam)

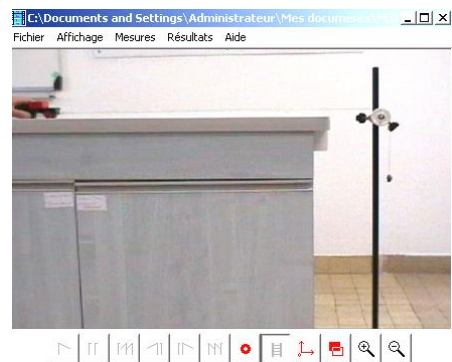
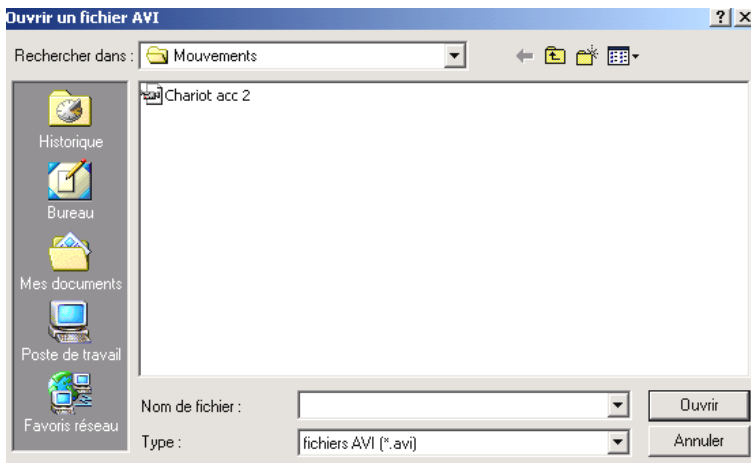
(20)

(Avistep)

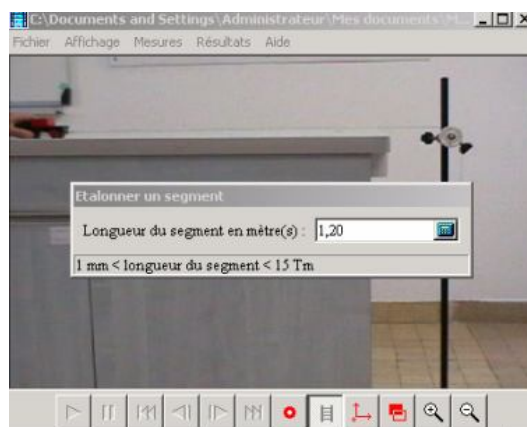
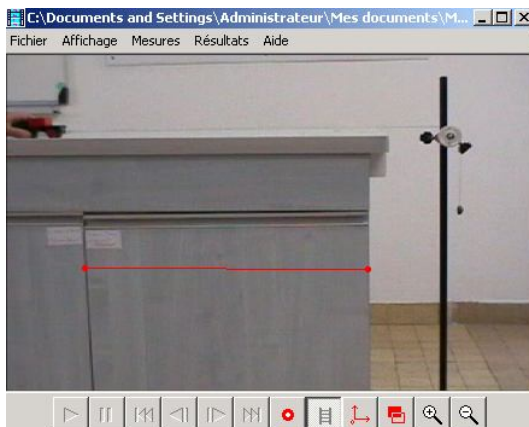
Avistep :1
(Ouvrir) (Fichier)

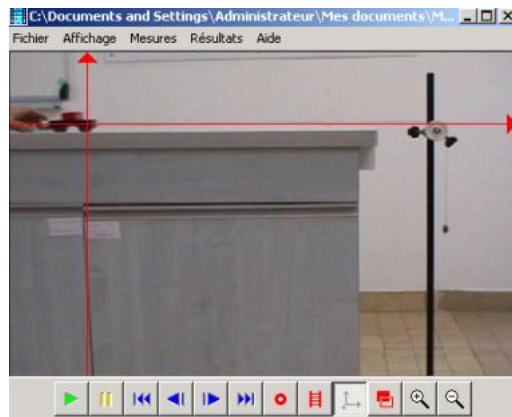


:2
(Ouvrir)



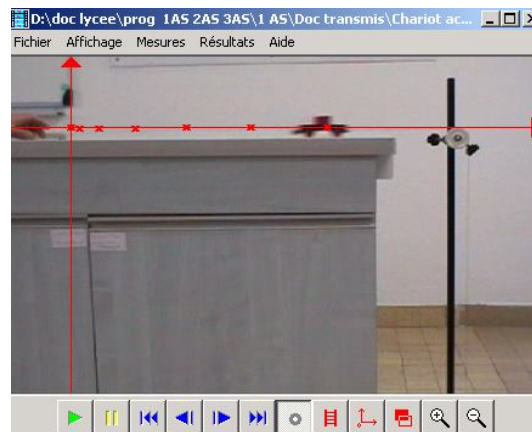
(Entrer)



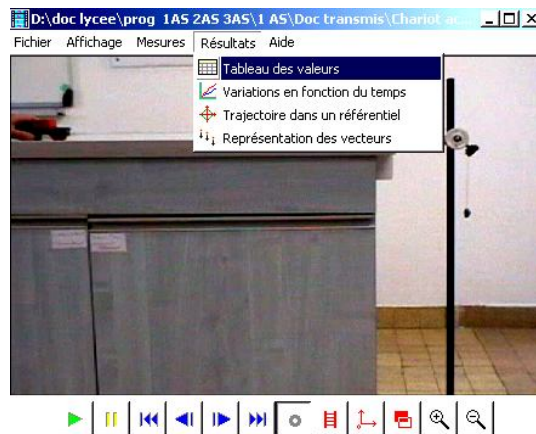


() :4

(*)



:5



.(Résultats)

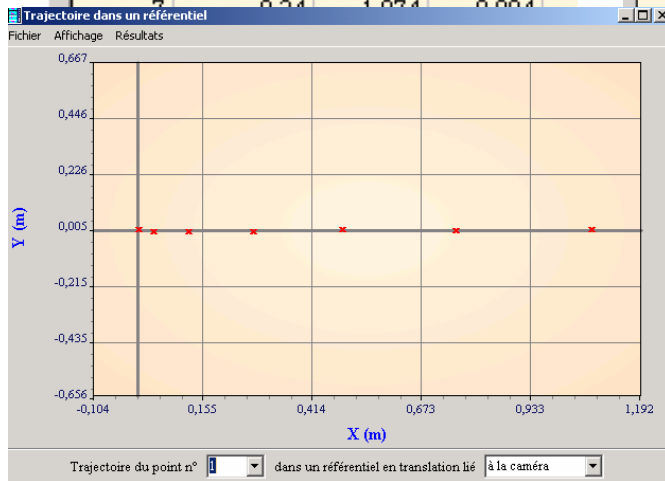
Tableau des valeurs				
Fichier Edition Affichage Calculs Résultats				
	Numéro	Date (s)	x1 (m)	y1 (m)
▶	1	0	0,003	0,004
	2	0,04	0,039	-0,004
	3	0,08	0,12	-0,004
	4	0,12	0,274	-0,004
	5	0,16	0,484	0,004
	6	0,2	0,752	0
	7	0,24	1,074	0,004

(Tableau des valeurs)

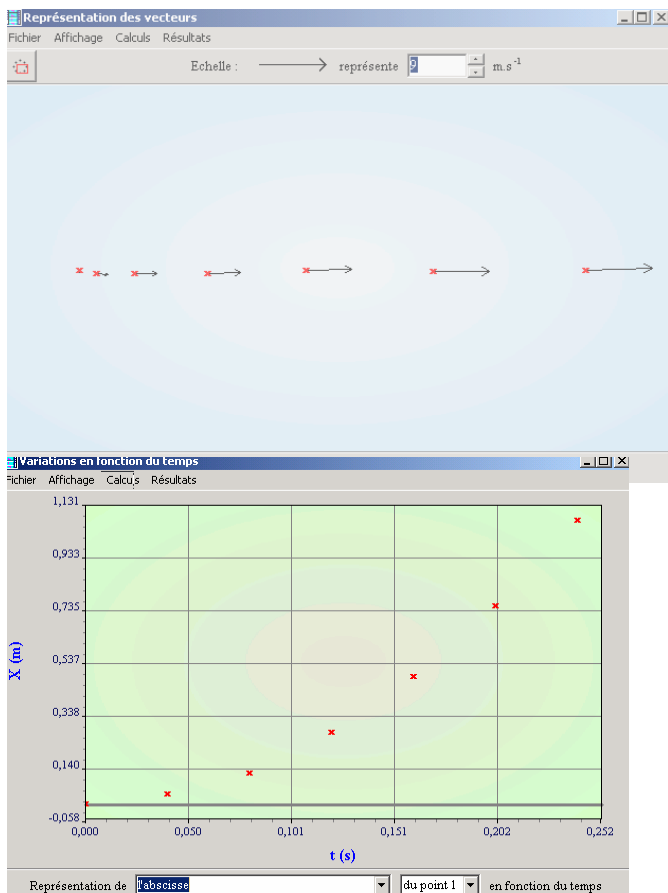
Tableau des valeurs				
Fichier	Edition	Affichage	Calculs	Résultats
Numéro	Date	Vitesse	Accélération	(m)
1				0,004
2	0,04	0,039	-0,004	
3	0,08	0,12	-0,004	
4	0,12	0,274	-0,004	
5	0,16	0,484	0,004	
6	0,2	0,752	0	
7	0,24	1,074	0,004	

(Affichage)

Tableau des valeurs							
Fichier	Edition	Affichage	Calculs	Résultats			
Numéro	Date (s)	x1 (m)	y1 (m)	vx1 (m/s)	vy1 (m/s)	v1 (m/s)	
1	0	0,003	0,004	0,047	-0,279	0,283	
2	0,04	0,039	-0,004	1,521	-0,093	1,524	
3	0,08	0,12	-0,004	2,994	0	2,994	
4	0,12	0,274	-0,004	4,468	0,093	4,469	
5	0,16	0,484	0,004	5,942	0,047	5,942	
6	0,2	0,752	0	7,415	0	7,415	
7	0,24	1,074	0,004	8,889	0,186	8,891	

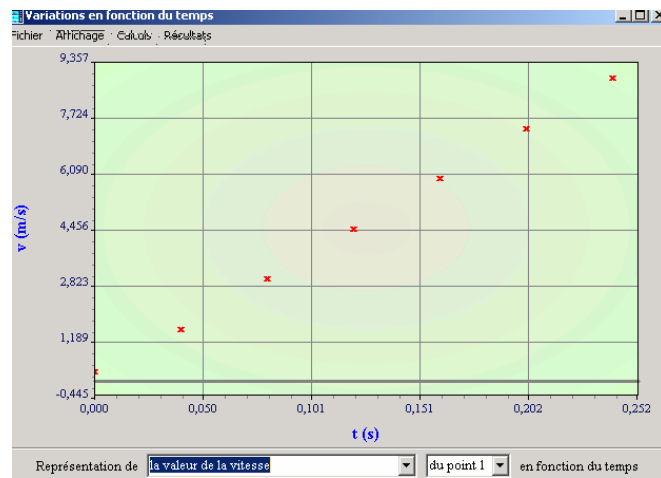
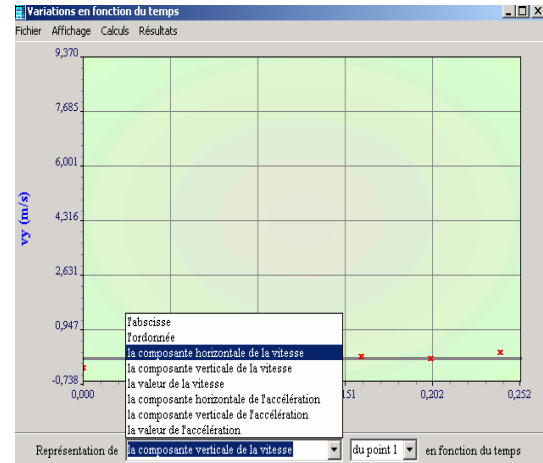
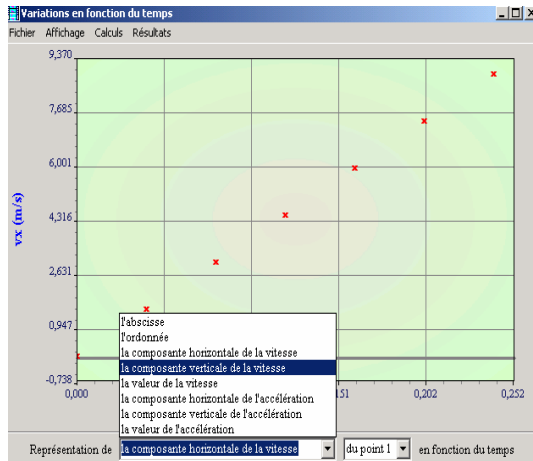


-1
(Résultats)
(Trajectoire dans un référentiel)



-2
(Résultats)
(Représentation)
(des vecteurs)

-3
(Résultats)
(variation en fonction du temps)



Lexique terminologique:

معجم المصطلحات:

الحركات والقوى:

	Astre	جُرم
	Charge	شحنة
	Circulaire	دائرية
	Cohésion	تماسك
	Concept	مفهوم
	Cosmique	كوني
	Curviligne	منحنية
	Exercée	مطبقة
	Force	قوة
	Force d'attraction universelle	قوة الجذب العام
	Friction	فرك
	Frottement	احتكاك
	Galaxie	مجرة
	Gravitationnelles	جاذبة
	Inertie	عطالة
	Interaction	فعل متبادل
	Intervalle	مجال
	Planète	كوكب
	Principe	مبدأ
	Projectile	قذيفة
	Propulsion	دفع
	Rayon	شعاع
	Rectiligne	مستقيمة
	Référentiel	المرجع
	Satellite	قمر اصطناعي
	Simulation	محاكاة
	Temps	زمن
	Uniforme	منتظمة
	Vitesse	سرعة

الضوء والأطياف الضوئية:

Absorption	امتصاص
Continu	مستمر
Deviation	انحراف
Dioptré plan	الكاسر المستوي
Dispersion	تبدد
Emission	إصدار
Fibres optiques	الألياف البصرية
Indice de réfraction	قرينة الانكسار
Lampes spectrales	مصابيح طيفية
Longueur d'onde	طول موجة
Monochromatique	وحيد اللون
Mouvements:	:
Prisme	الموشور
Radiation	إشعاع
Raies du spectre	خطوط الطيف
Refraction	انكسار
Reflection	انعكاس
Réseau	شبكة
Spectre	طيف:
Transparent	شفاف
Tubes fluorescents	مصباح متألق

Lexique terminologique:

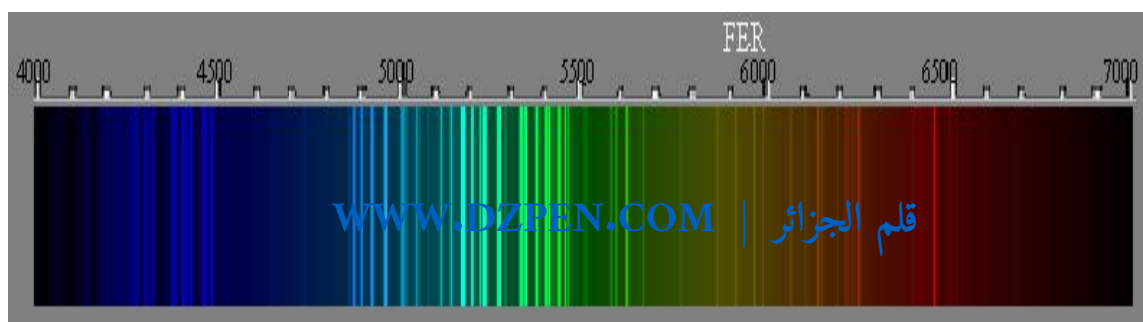
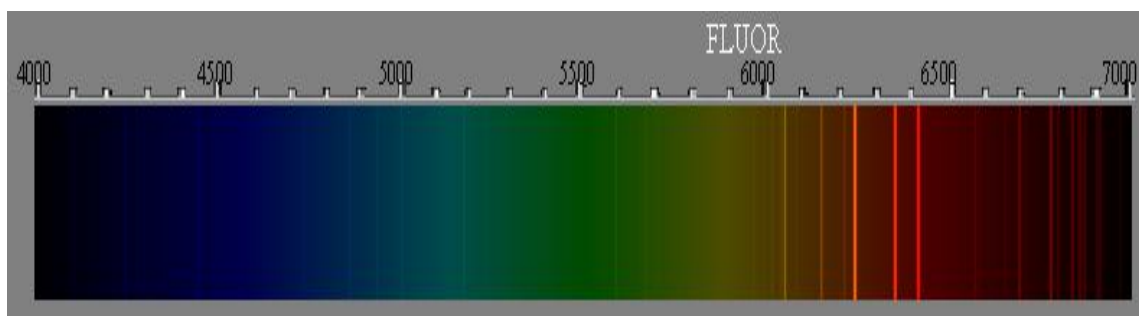
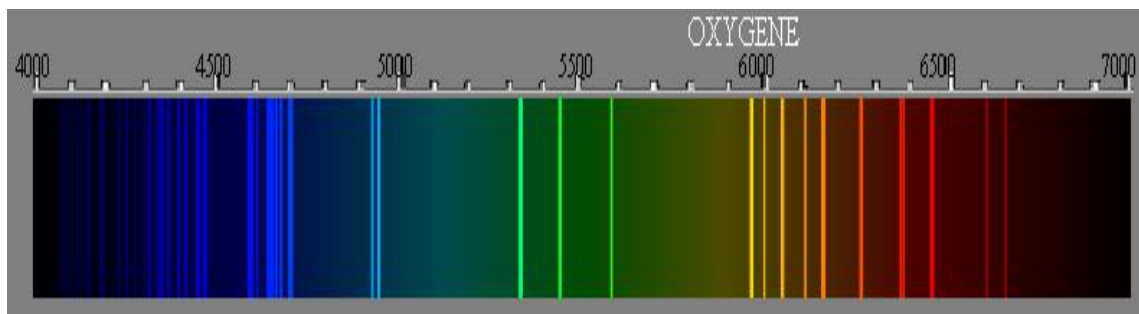
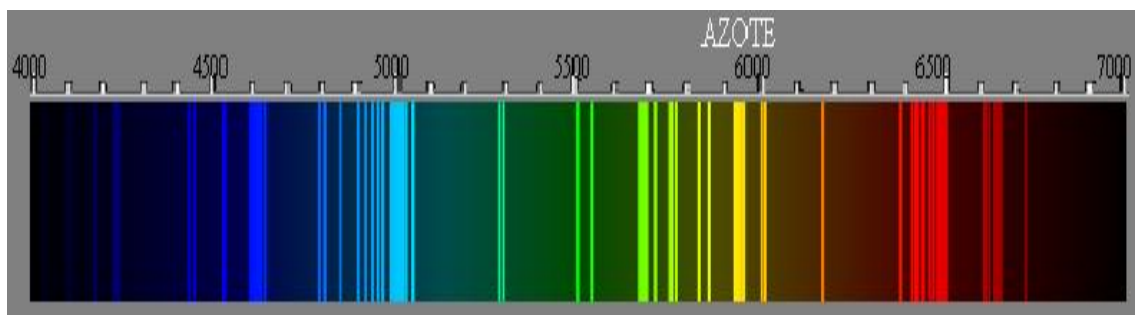
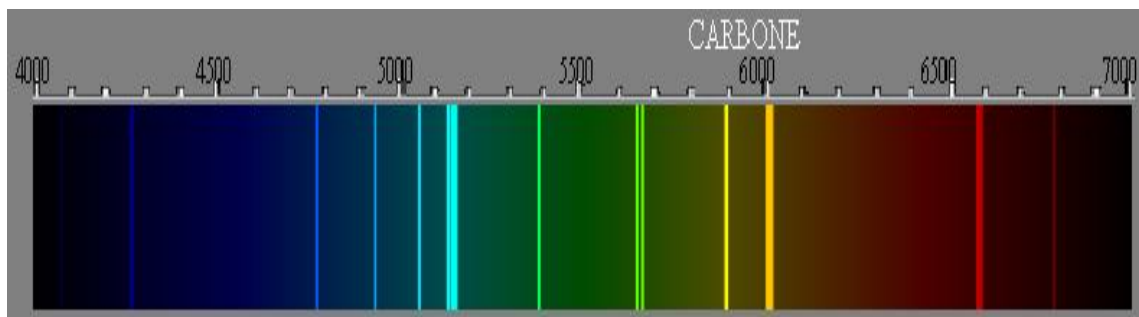
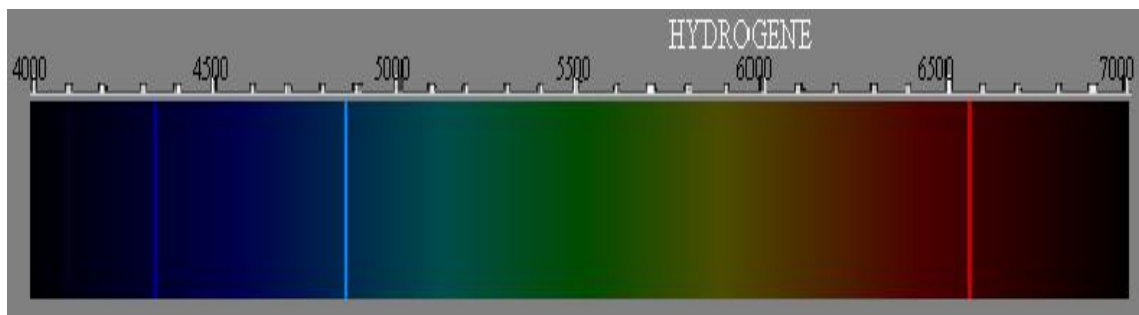
:

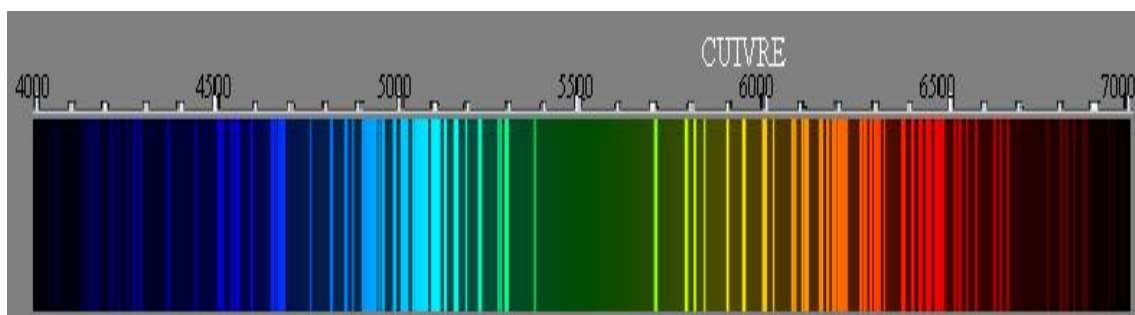
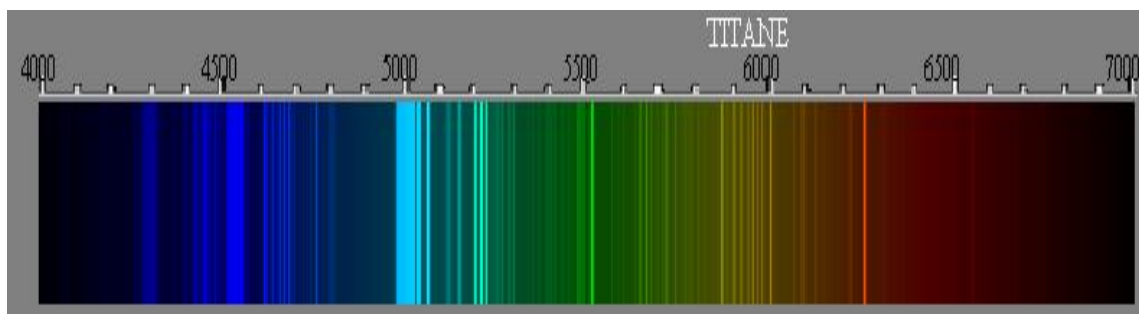
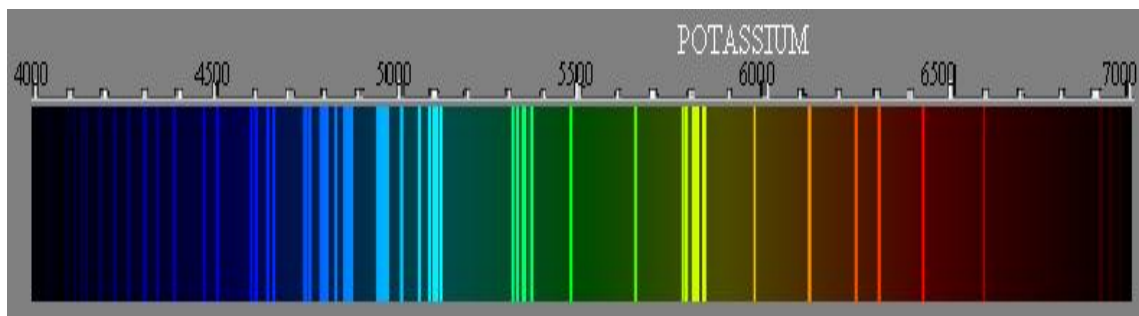
	Astre	
	Charge	
	Circulaire	
	Cohésion	
	Concept	
	Cosmique	
	Curviligne	
	Exercée	
	Force	
	Force d'attraction universelle	
	Friction	
	Frottement	
	Galaxie	
	Gravitationnelles	
	Inertie	
	Interaction	
	Intervalle	
	Planète	
	Principe	
	Projectile	
	Propulsion	
	Rayon	
	tiligneRec	
	Référentiel	
	Satellite	
	Simulation	
	Temps	
	Uniforme	
	Vitesse	

	Absorption	
	Continu	
	Deviation	
	Dioptre plan	
	Dispersion	
	Emission	
	Fibres optiques	
	Indice de réfraction	
	Lampes spectrales	
	Longueur d'onde	
	Monochromatique	
	Mouvements:	:
	Prisme	
	Radiation	
	Raies du spectres	
	Réfraction	
	Reflection	
	Réseau	
	Spectre	:
	Transparent	
	Tubes fluorescents	

	Modèle	
	Approche quantitative	
	Atome	
	Avancement chimique	
	Avancement maximale	
	Composition centésimale	
	Concentration	
	Concentration molaire	
	Conductivité	
	Couples liants	
	Dilué	
	Electron	
	Électronégativité	
	Électropositivité	
	Element chimique	
	Entité chimique	
	Equation chimique	
	Espèce chimique	
	Evolution d'un système chimique	
	Formule brute	
	Formule développée	
	Gaz inerte	
	Isotopes	
	Liaison covalente	
	Liaison polarisée	
	Macroscopique	
	Masse atomique	
	Masse molaire	
	Masse moléculaire	
	Matière	
	Microscopique	
	Modèle	
	Mole	
	Molecule	
	Noyau	
	Ordre de grandeur	

	Particule	
	Pression	
	Proton	
	Quantité de matière	
	Réactif limitant	
	Réaction chimique	
	Règle de l'octet	
	Règle du doublet	
	Saturé	
	Solution	
	Solution aqueuse	
	Structure	
	Système chimique	
	Tableau périodique	
	Température	
	Transformation chimique	





[الصفحة الرئيسية](#)

