

الوثيقة المرافقة

مادة العلوم الفيزيائية

2

2006



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Gilles Tremblay

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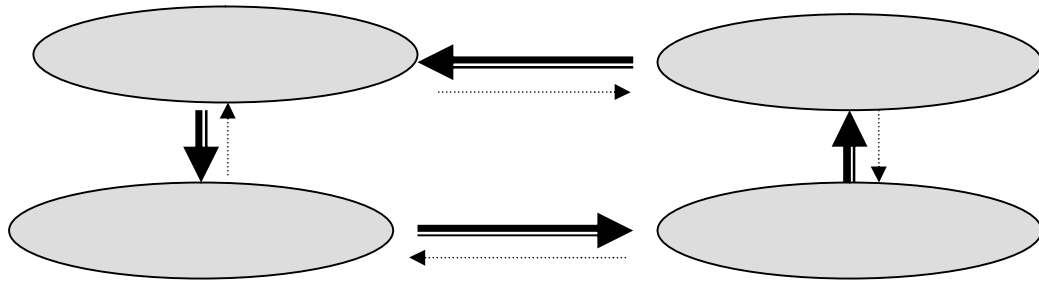
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G. BACHELARD

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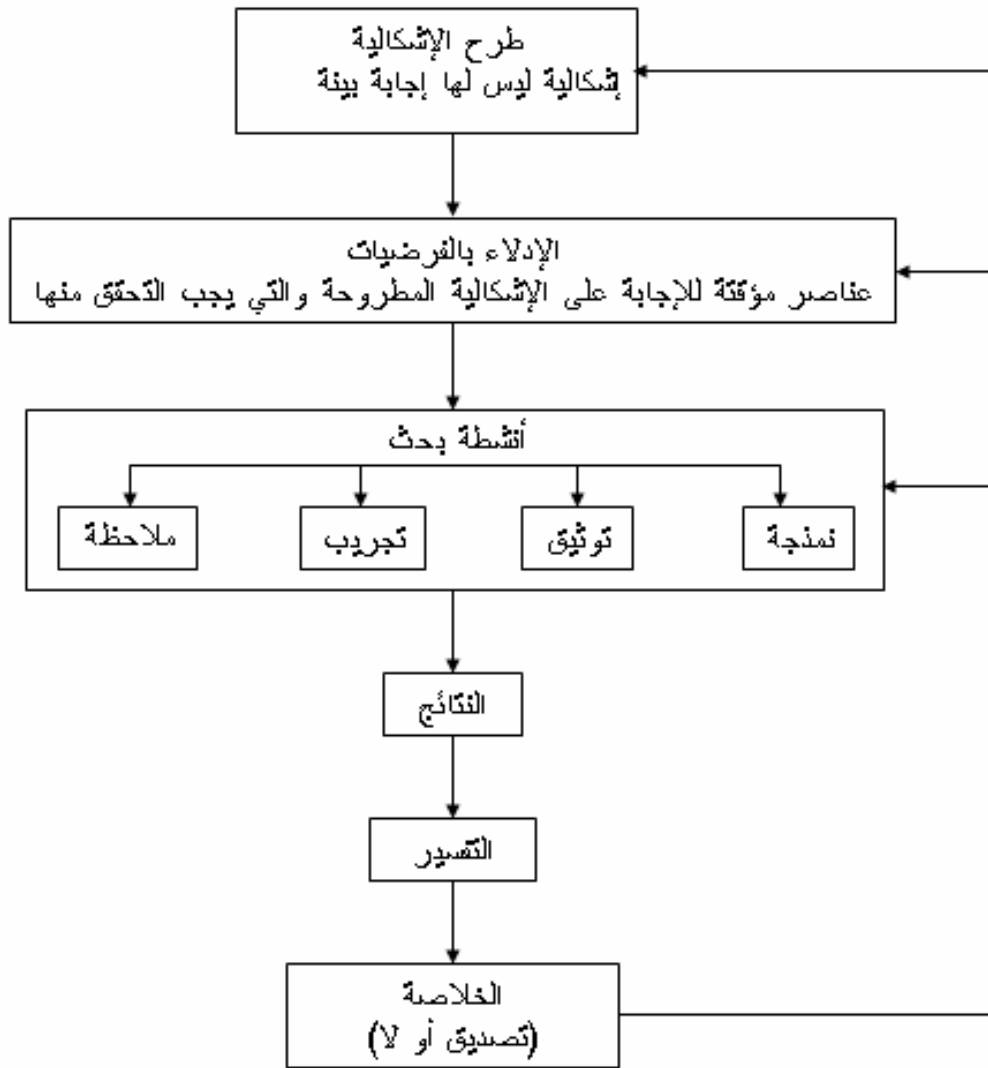
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- (langages des signes)

.(propositions formées avec des mots)

(outil rationnel) :

(réalité empirique)

:(différents types de modèles) 2-3

(maquettes -) *

() (homothétiques) (représentations concrètes)

▪ () (analogiques)

. () (intuitivement)

Halbwachs

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) (modèles descriptifs)

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⋮ () (modèles images)

réalité)

Halbwachs

- (sensible

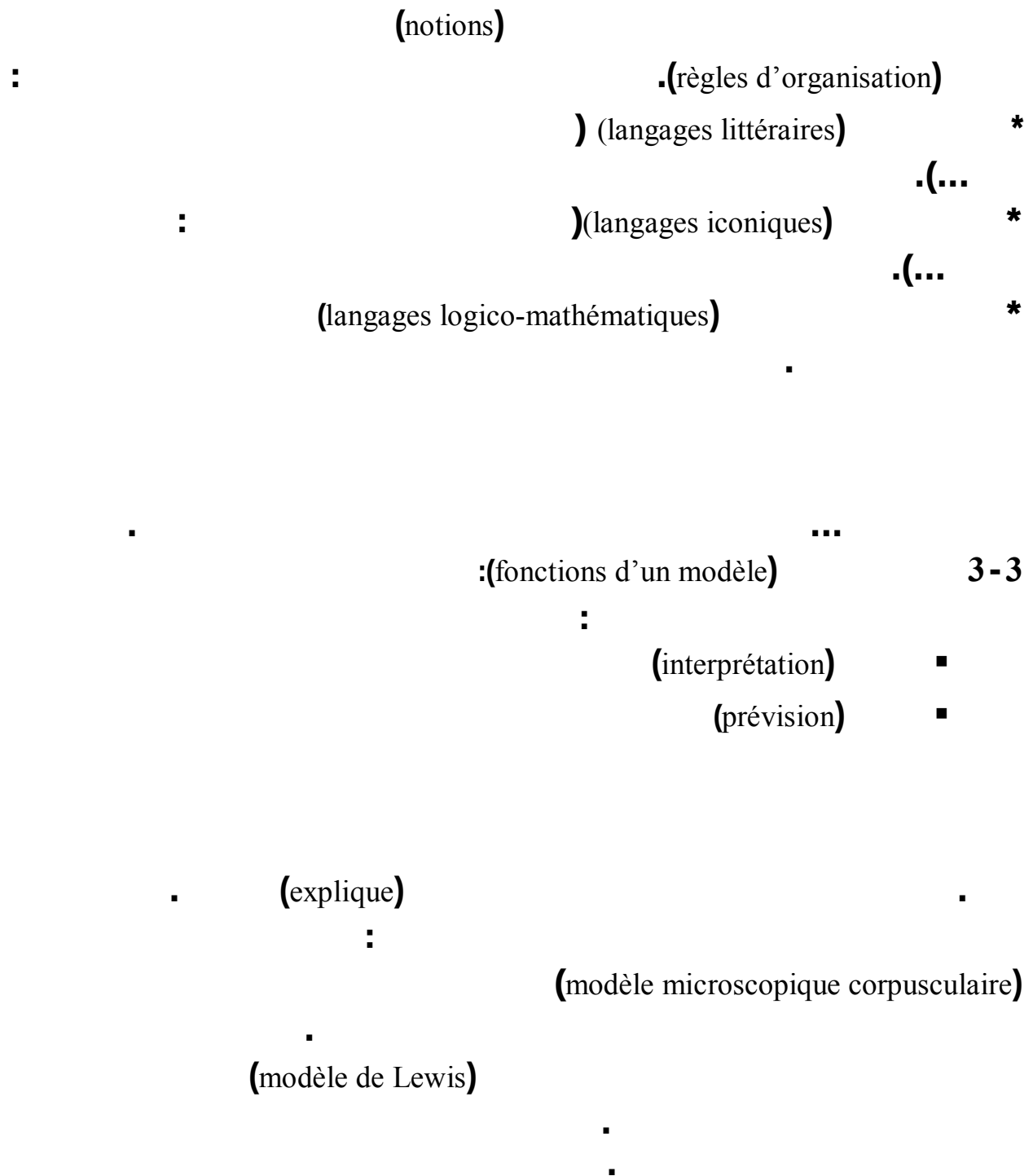
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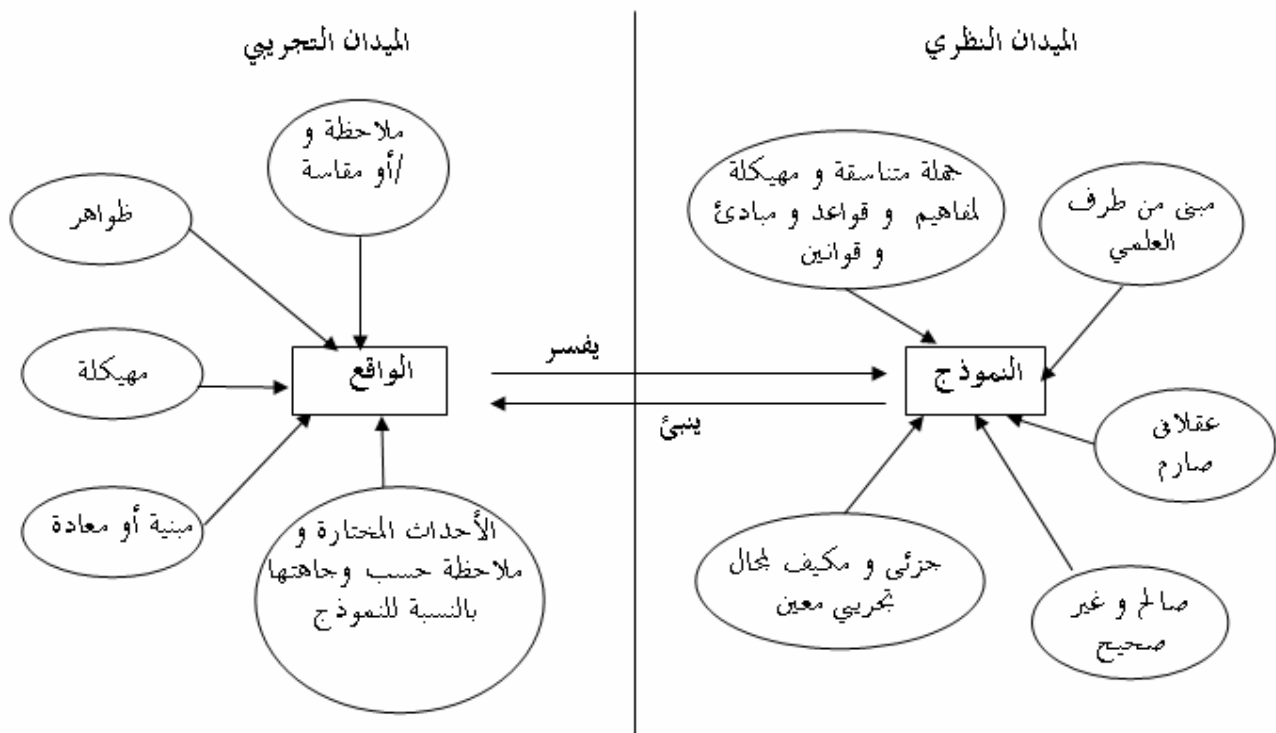
(abstraite de la réalité

.(modèles symboliques)

.(analogie hydraulique)

□ □





4-3 (structure de la réalité empirique) *

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5-3 (concepts) :

• (catégoriels) -

• (approche empiriste) (formels) -

(non contradiction) (cohérence) (rationnelle)

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(relations sémantiques)

(domains)

(structure théorique)

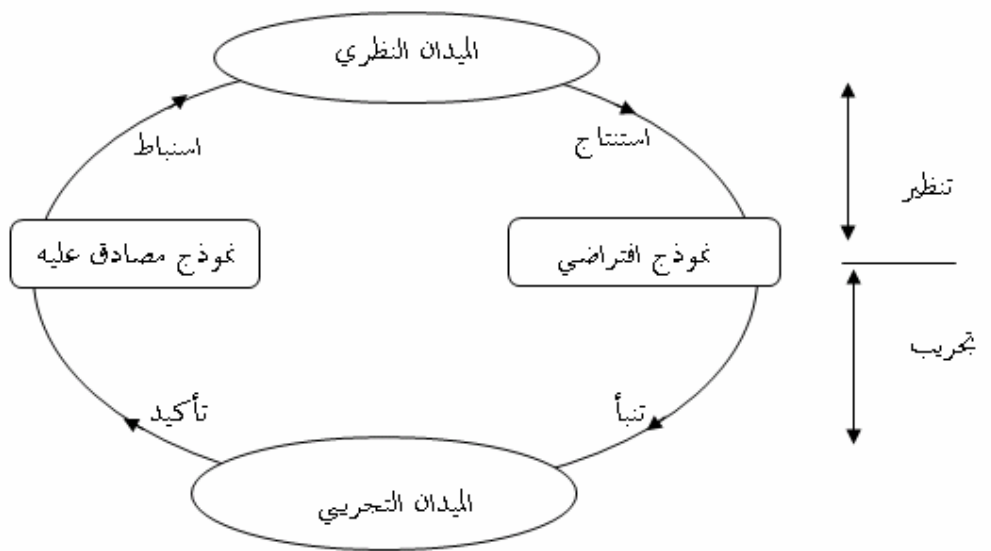
(structure empirique)



6-3

(modèles hypothétiques)

(confirmation) (modèles existants)



:(phase déductive)

.(hypothèses) (testé)

:(phase prévisionnelle)

: (phase de validation)

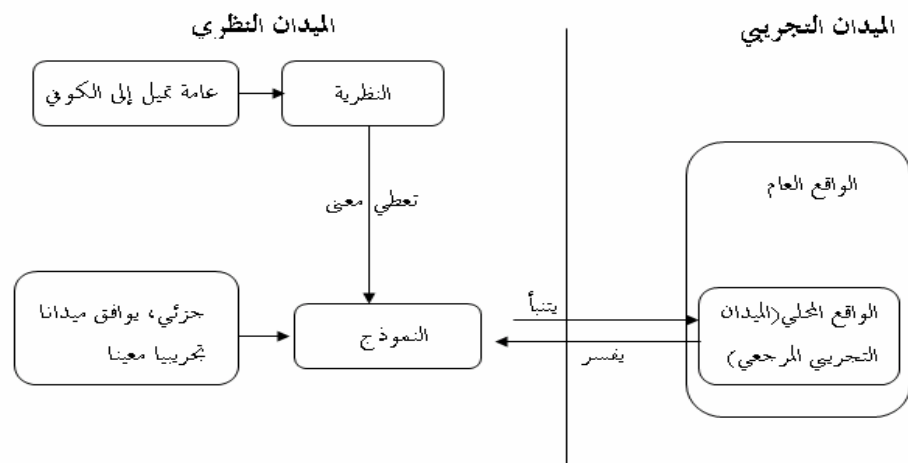
:(phase inductive)

.(réfèrent)

أنشطة بنيوية (activités syntaxiques) (تشغيل)

:(sémantiques)

(invalidé)



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

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$\Delta E_{th} = mc(T_f - T_i)$	-	2	-4
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تقدم الاستطاعة على أنها سرعة تحويل الطاقة، ومن هذا المنطلق، فإن الاستطاعة لها نفس البعد لمفهوم السرعة في الميكانيك أو معنى الغزارة في المائع. ومنه فلا وجود للتعبيرين: الاستطاعة المكتسبة والاستطاعة المفقودة، وإنما تصاغ الاستطاعة كما يلي: استطاعة الجملة على اكتساب الطاقة أو استطاعة الجملة على فقدان الطاقة.

وذلك للتمييز بين الطاقة كمقدار فيزيائي وحدته الـ (جول J) ، والاستطاعة كمقدار عددي للتعبير عن مدى سرعة تحويل الطاقة ووحدته في الجملة الدولية الـ (واط W).

يمكن توزيع هذه الوحدة على حصتين:

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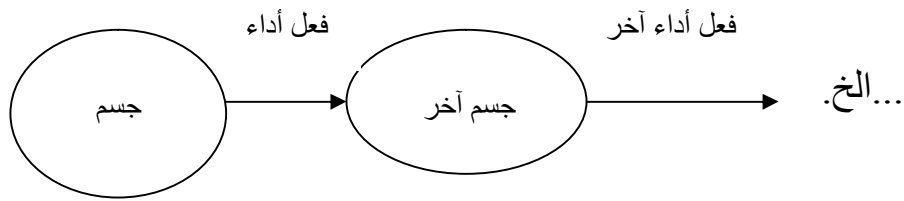
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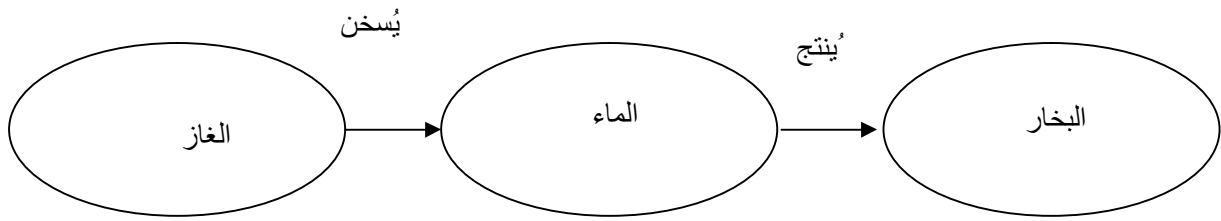
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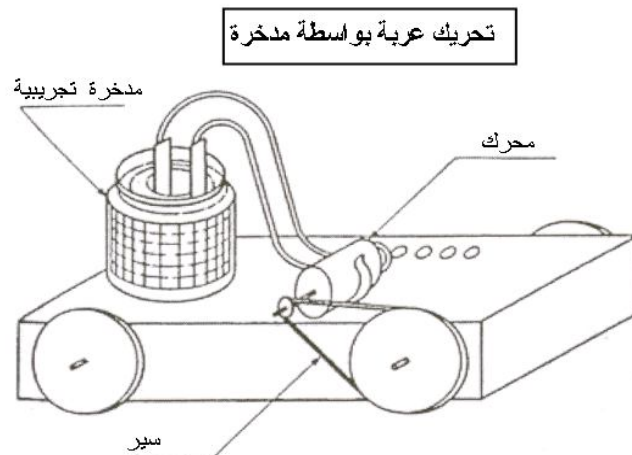
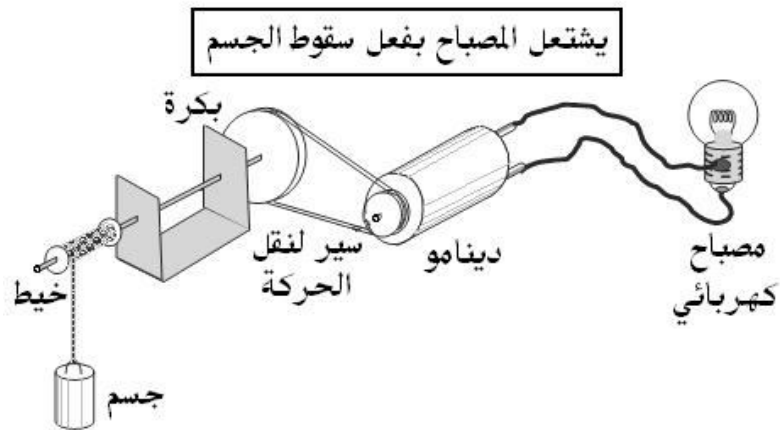
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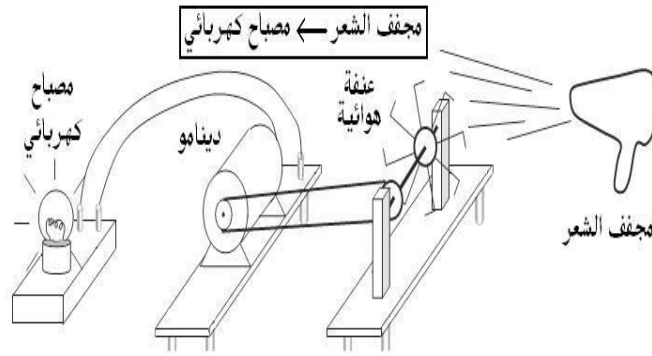
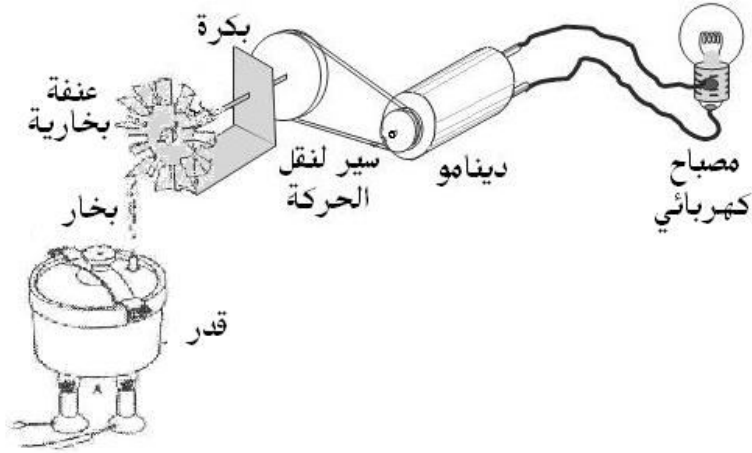
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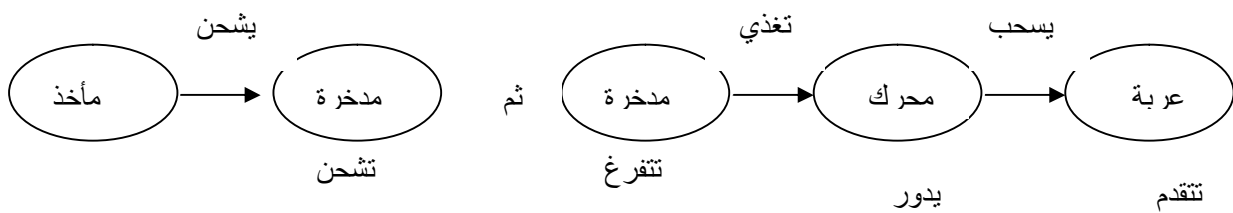
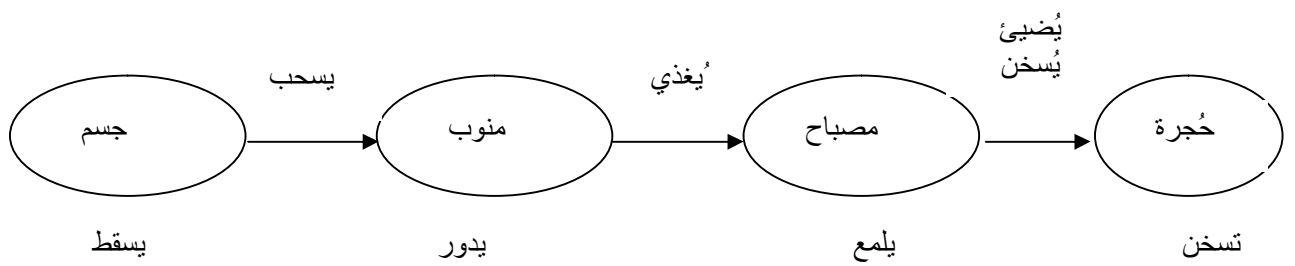
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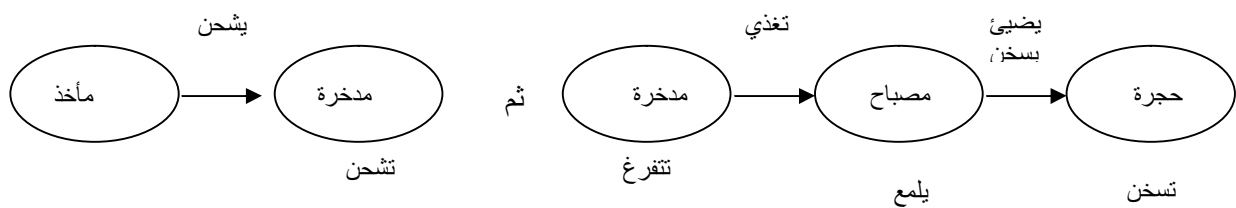
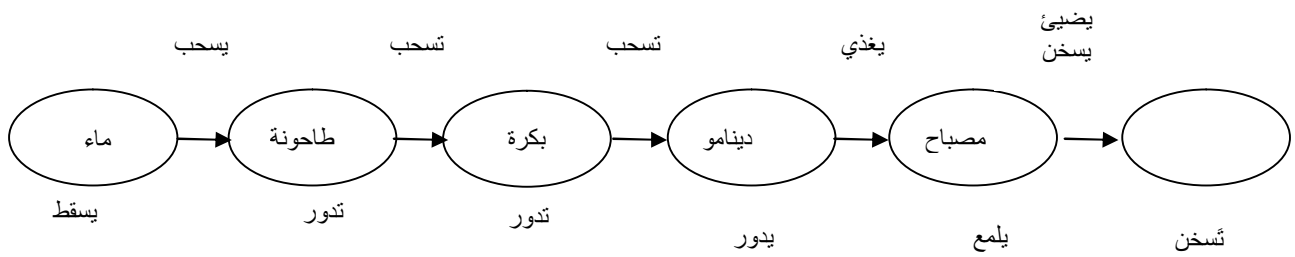
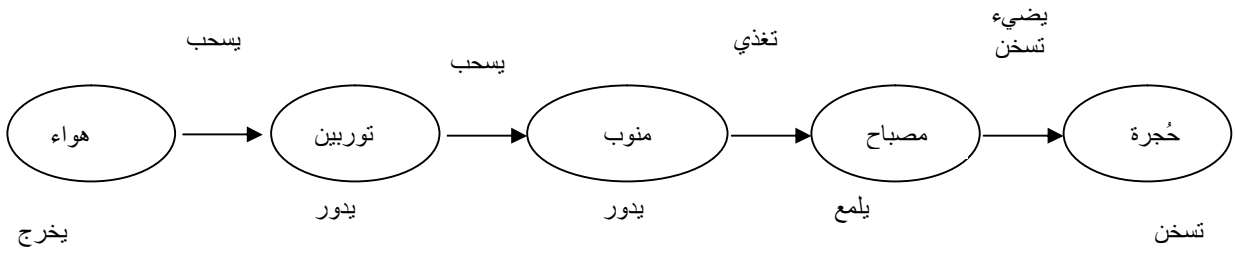
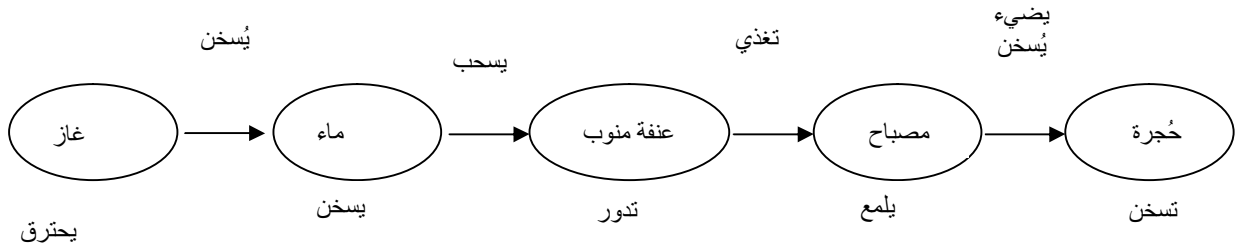


يشعل المصباح إنطلاقا من قارورة غاز الموقد

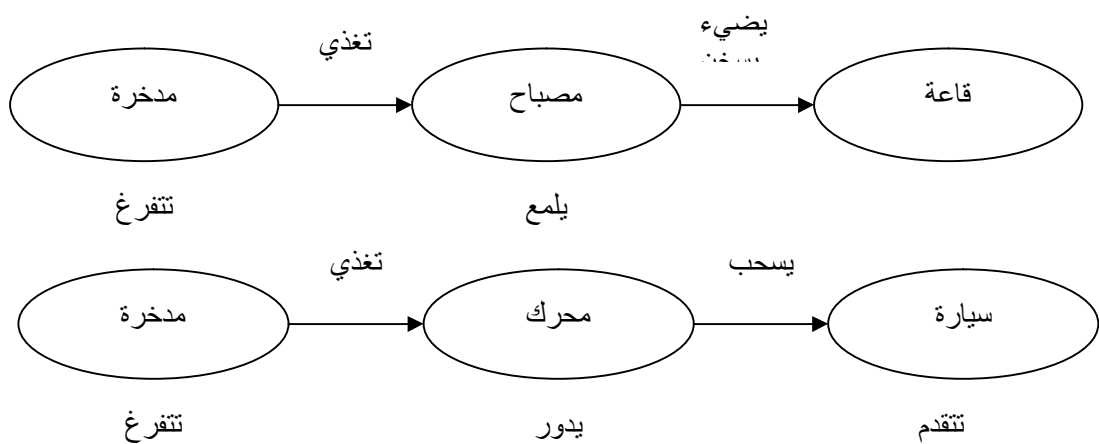


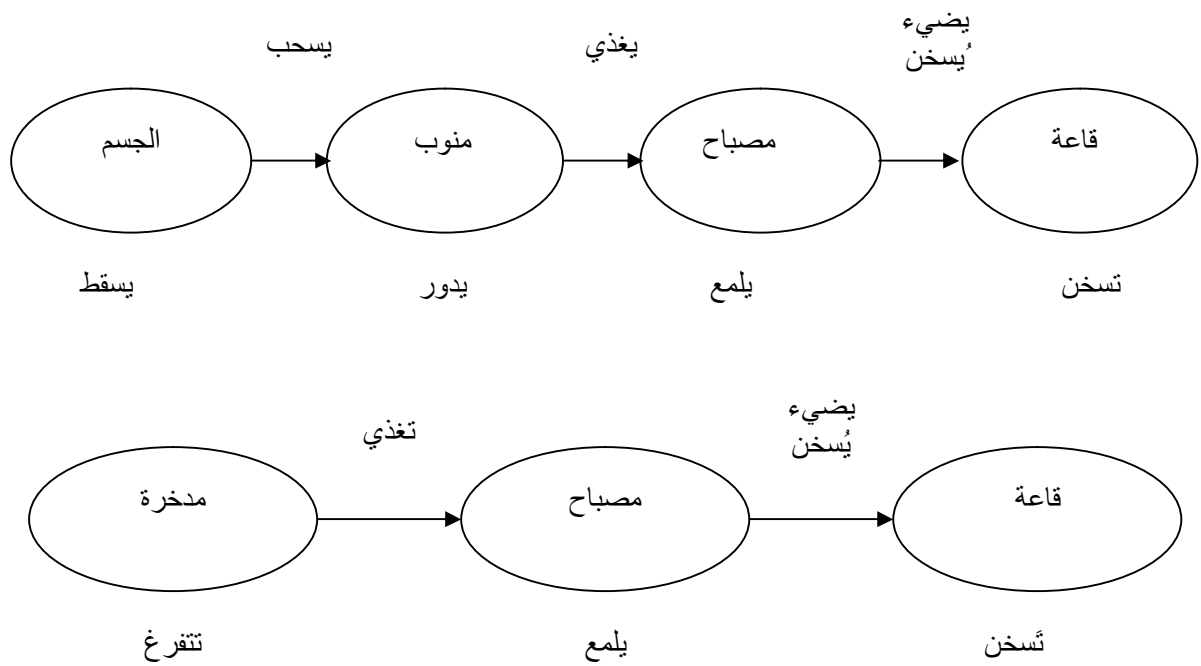
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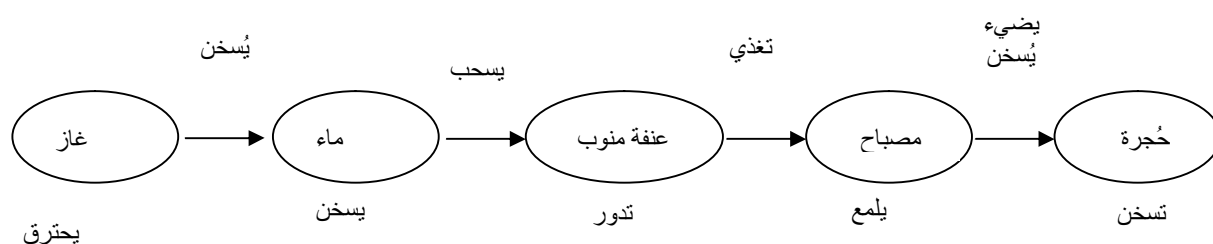
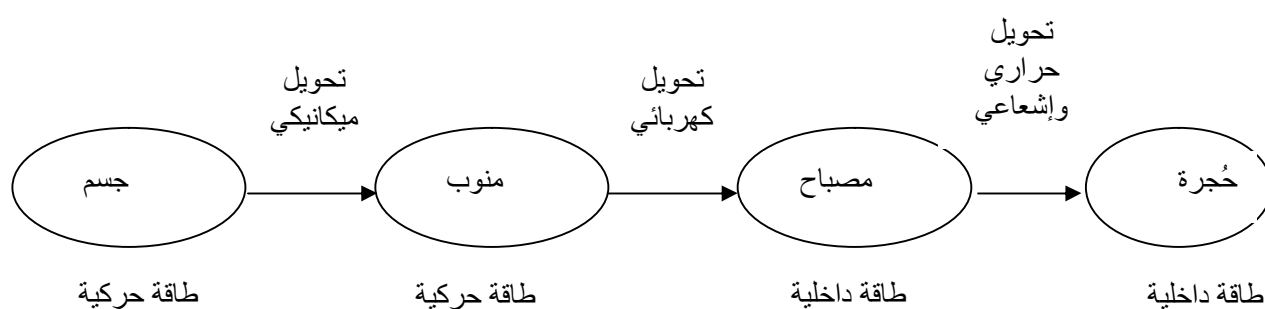
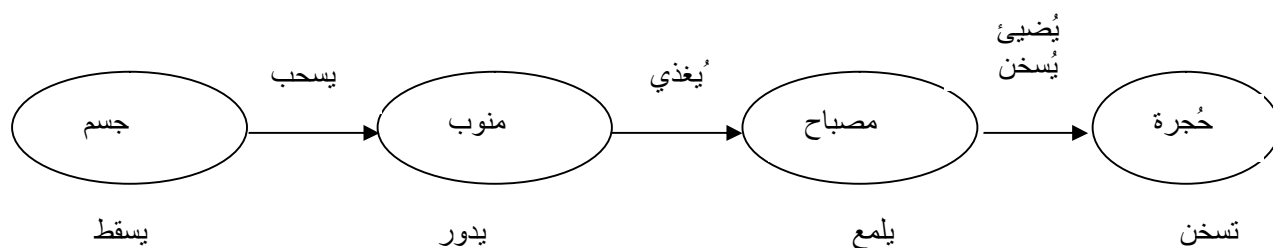
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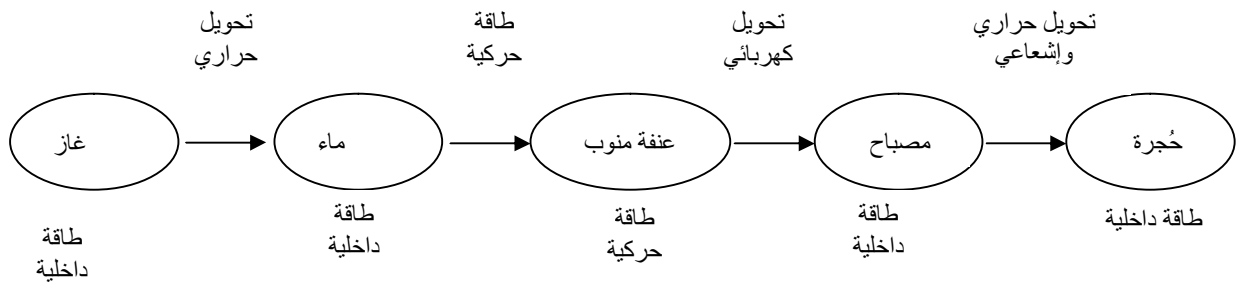
E_r

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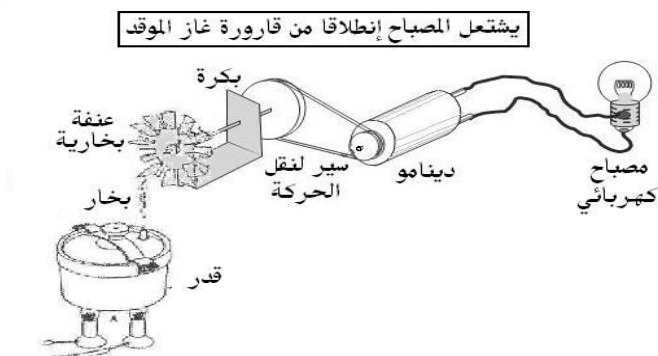
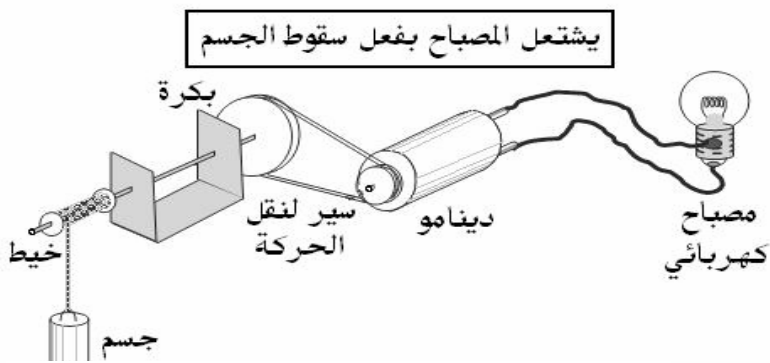
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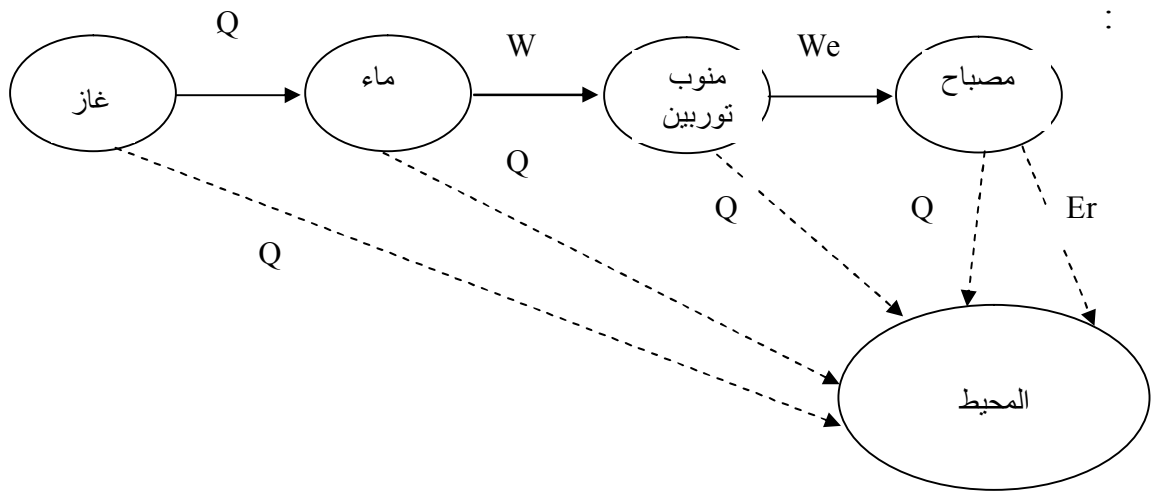
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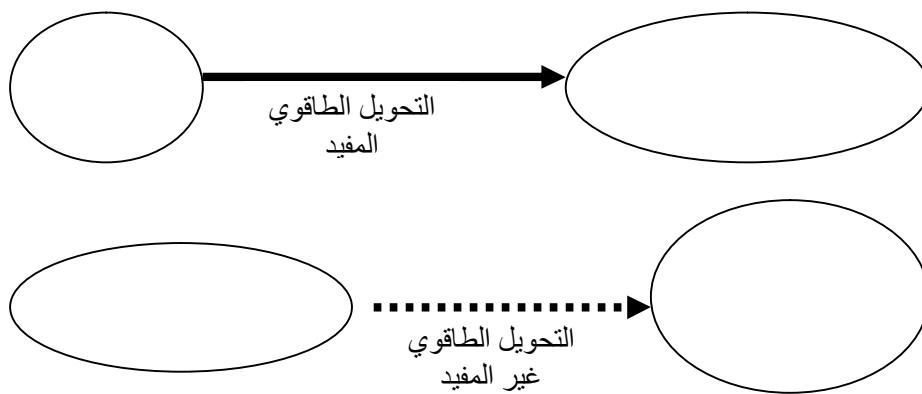
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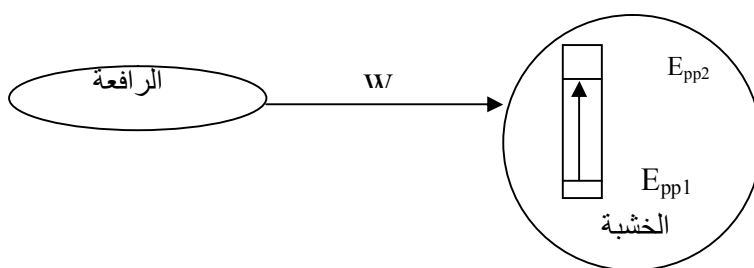
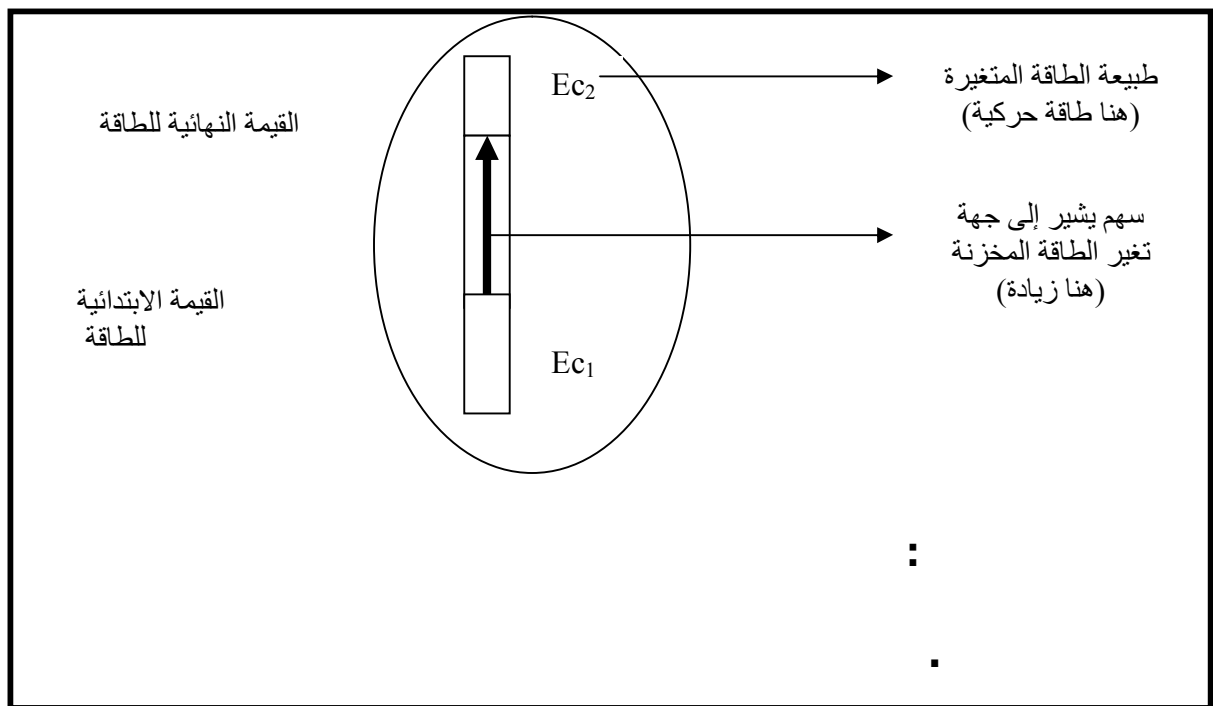


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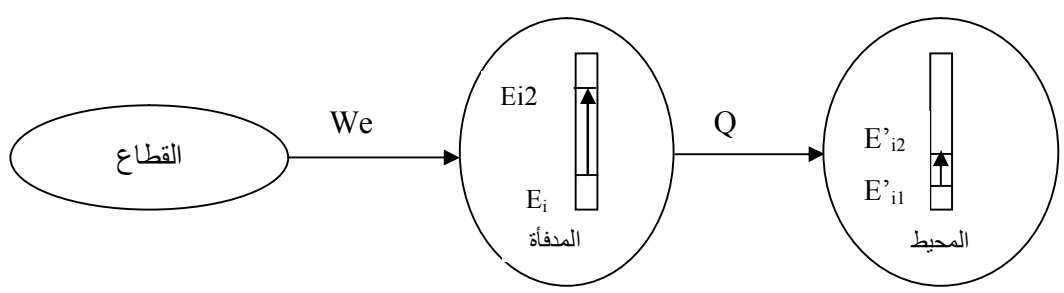
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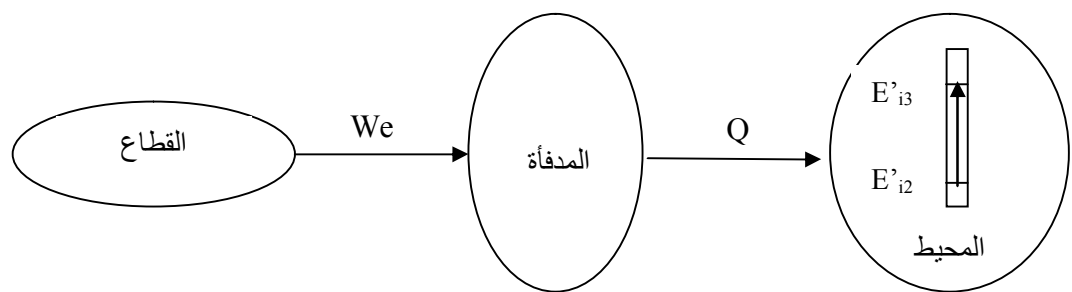
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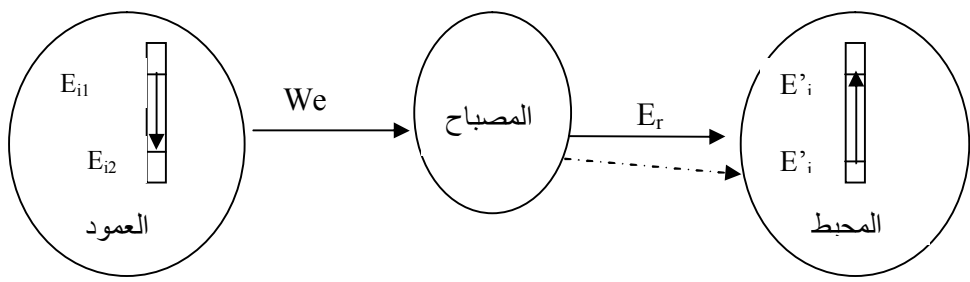


() (t₂)



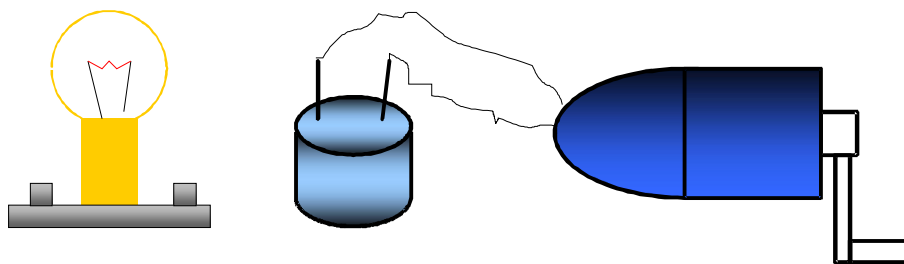
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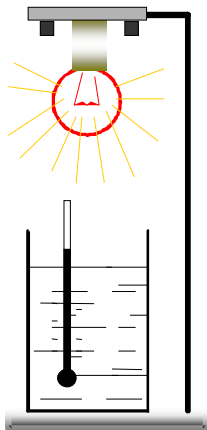
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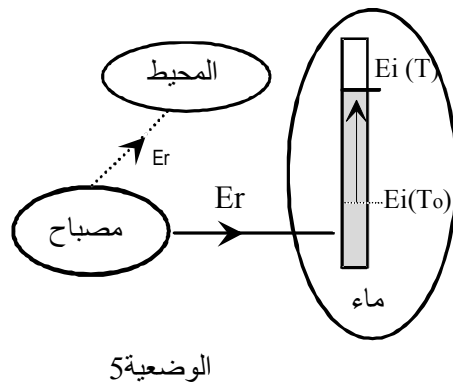
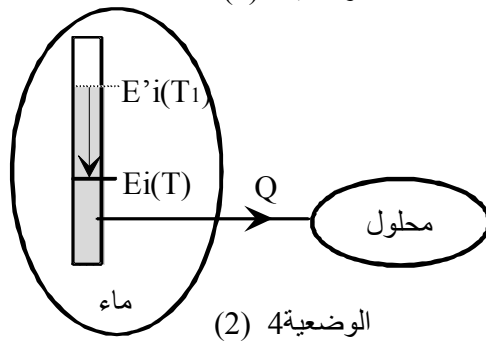
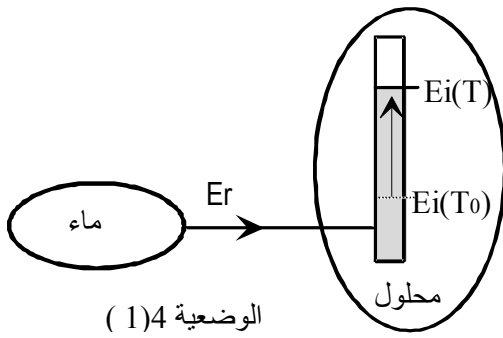
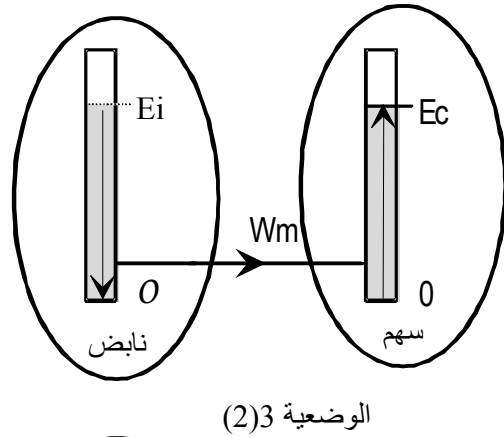
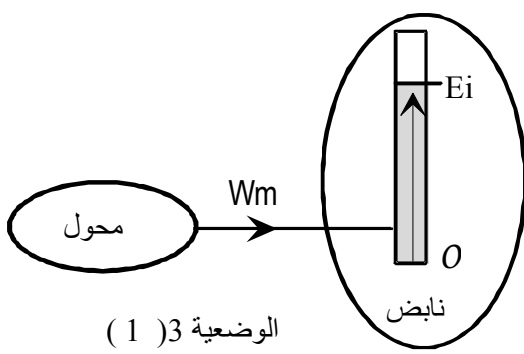
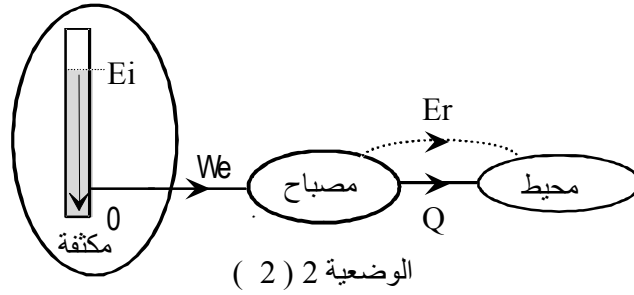
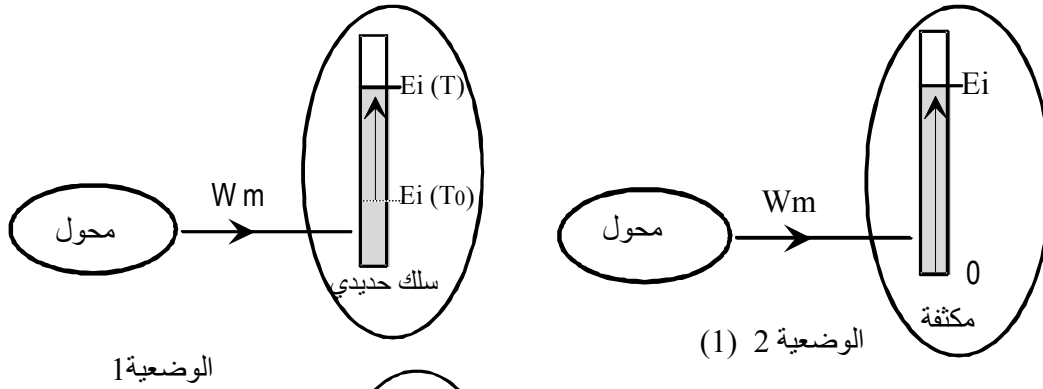


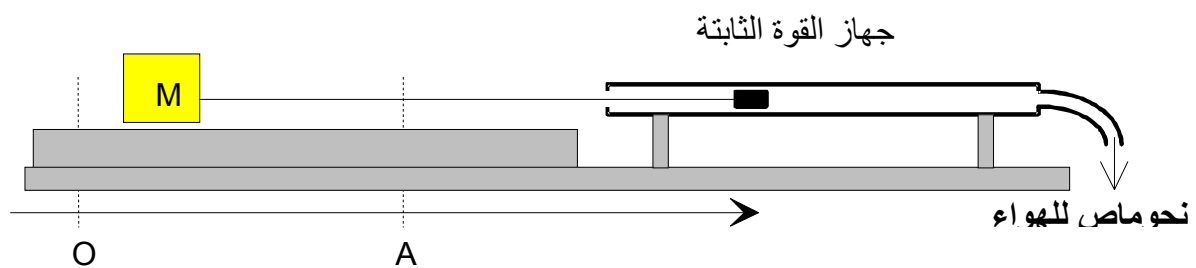
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$T_o :$





$$W = a(M+V) \quad , \quad W = aMV \quad , \quad W = aMV^2 \quad , \quad W = aM^2V \quad , \quad W = aM^2V^2$$

$$W = a\frac{V}{M} \quad , \quad W = a\frac{M}{V}$$

$$W = \frac{1}{2} MV^2$$

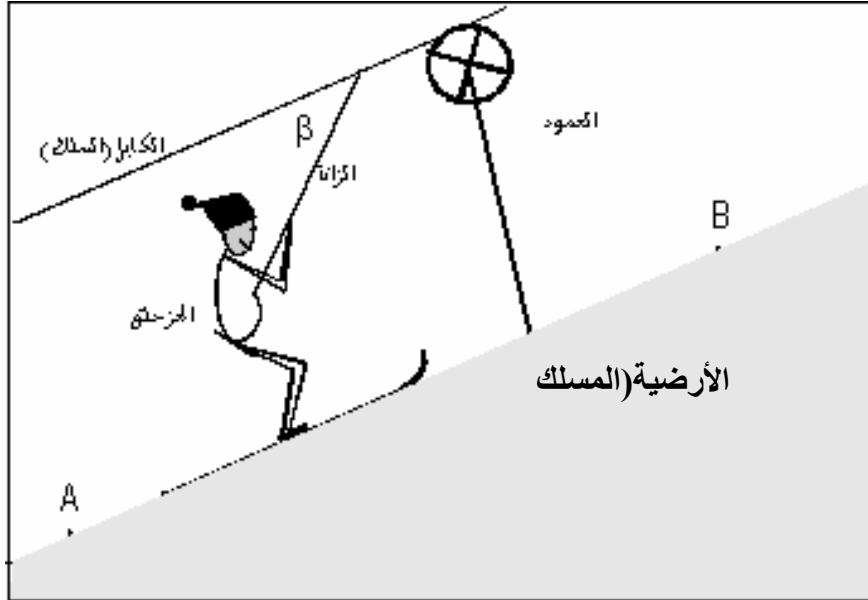
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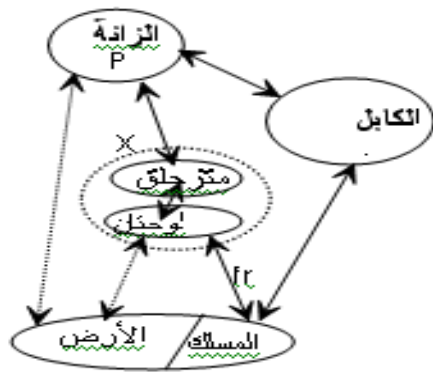
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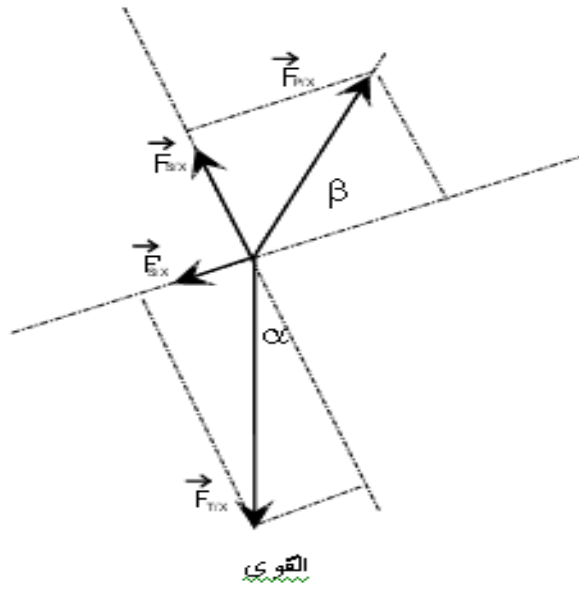
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$W_{AB}(\vec{F}_{P/x}) :$

AB

$$(1) \quad \vec{F}_{P/X} + \vec{F}'_{S/X} + \vec{F}_{T/X} + \vec{F}_{S/X} = \vec{0}$$

$$(1)$$

$$(2) \quad F_{P/X} \cdot \cos \beta = F'_{S/X} + F_{T/X} \cdot \sin \alpha$$

:(

$$W_R = W_{AB}(\vec{F}_{P/X}) = F_{P/X} \cdot AB \cdot \cos \beta$$

$$(2)$$

$$W_R = F_{T/X} \cdot AB \cdot \sin \alpha + F'_{S/X} \cdot AB$$

$$W_R = M \cdot g(z_B - z_A) + F'_{S/X} \cdot AB$$

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$$M \cdot g(z_B - z_A) -$$

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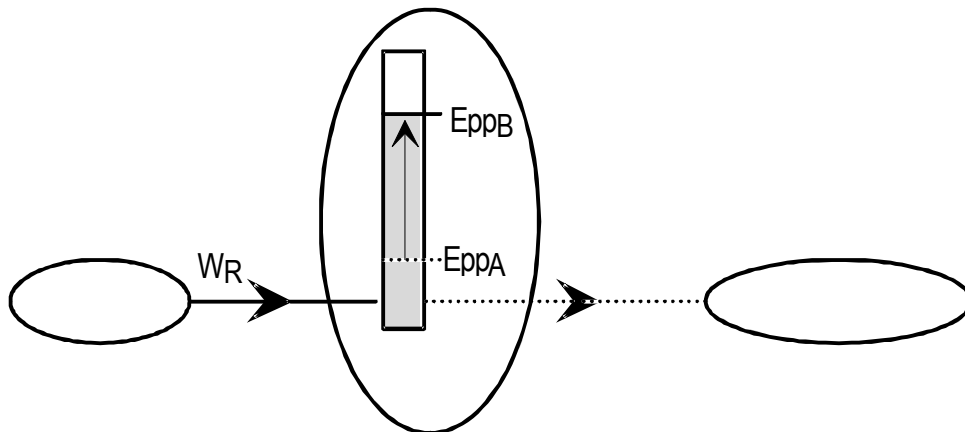
$$E_{pp} = M \cdot g \cdot z :$$

$$F'_{S/X} \cdot AB$$

$$W_R$$

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$$E_{ppB} = E_{ppA} + W_R - (F'_{S/X} \cdot AB)$$



$$F'_{S/X} \cdot AB$$

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$$F'_{S/X} \cdot AB$$

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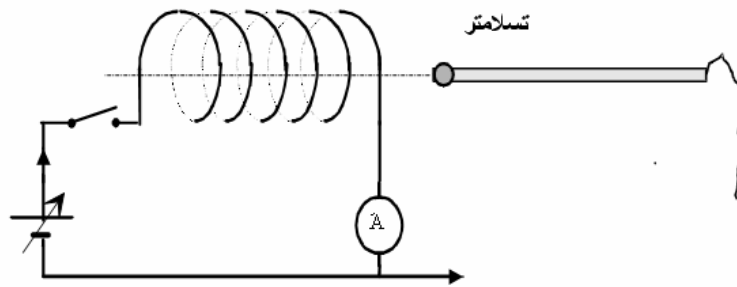
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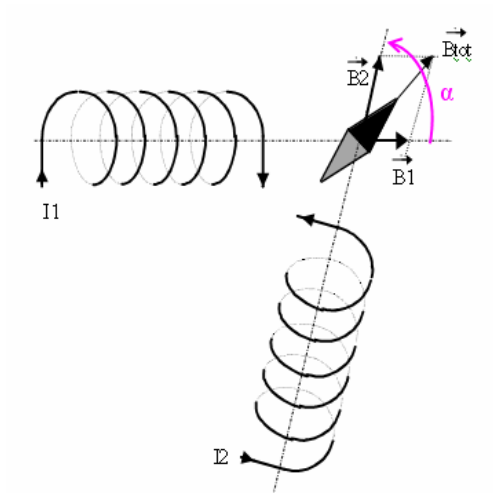
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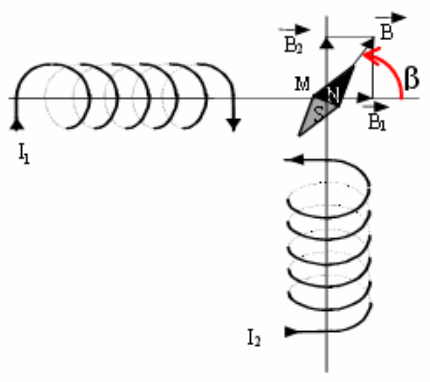
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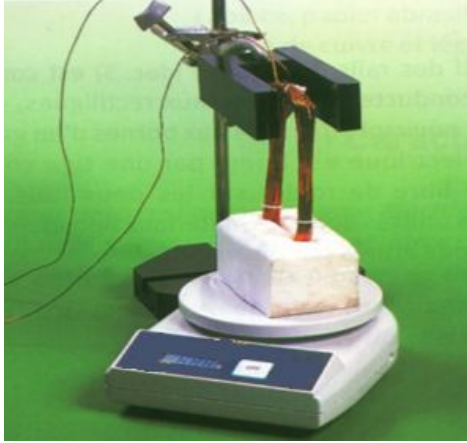


β

$B^2 = B_1^2 + B_2^2$ $tg\beta = \frac{B_2}{B_1}$:



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I=100 i : F= KI F= f(I) -

K= BL -

I B α -

°90 °60 °45 °30 °0 α -

. F=f(sin α) -

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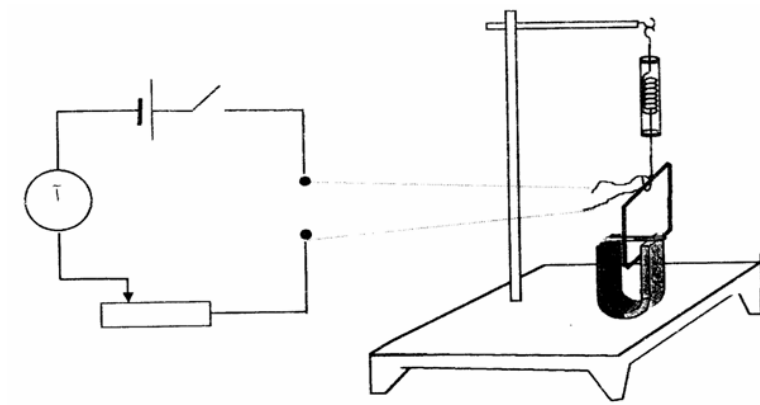
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F= T-P :

F

-

:

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I (A)					
T (N)					
F= T-P(N)					

-3

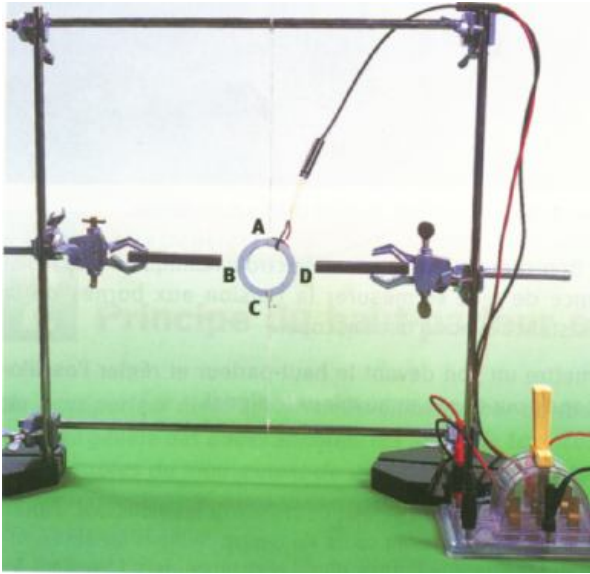
:

F=f(I)

-

. B

-



(200)

A ,B,C,D

$\vec{F}$

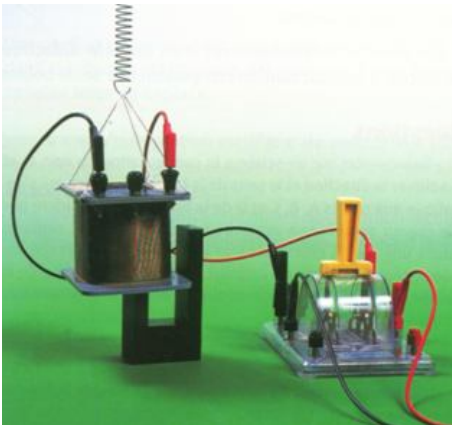
-1

للزاوية α_0

-2

بين محور الوشاعة و محور المغناطيسين. ما هي قيمة الزاوية α_0 ؟
 3- ما هي حركة الوشاعة لو عكسنا جهة التيار في كل مرة تدور بالزاوية α_0 ؟ حاول تحقيق التجربة.

2:



500)

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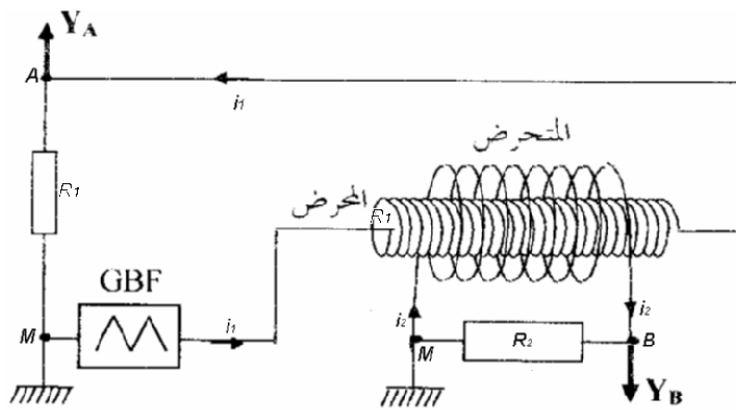
:

-1

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-2

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(17Ω 1200 14Ω 2000)

$R_2=10k\Omega$ $R_1=1k\Omega$

GBF

f_1

Y_A

Y_B

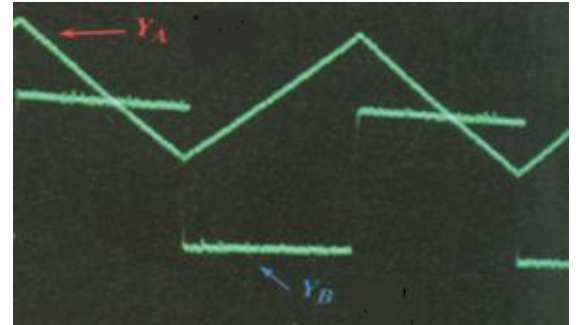
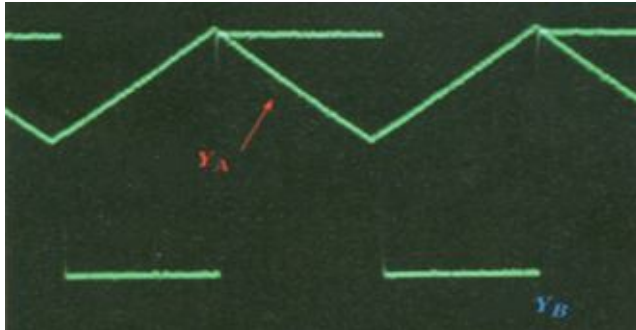
$$U_{BM}=R_2 I_2 \quad U_{AM}=R_1 I_1$$

f_2

U_{BM}

=	$f_1=$	
		ΔU_{AM}
		Δt
		$\Delta U_{AM}/\Delta t$
		$\Delta I_1/\Delta t$
		U_{BM}
		I_2
		$I_2 / \Delta I_1/\Delta t$

$$\begin{array}{rcl}
 I_2 & I_1 & - \\
 & & \vdots \\
 & & - \\
 & & - \\
 & & - \\
 (U_{AM}=R_1 I_1) & R_1 & Y_A - \\
 (U_{BM}=R_2 I_2) & R_2 & Y_B - \\
 & & - \\
 & & \vdots
 \end{array}$$

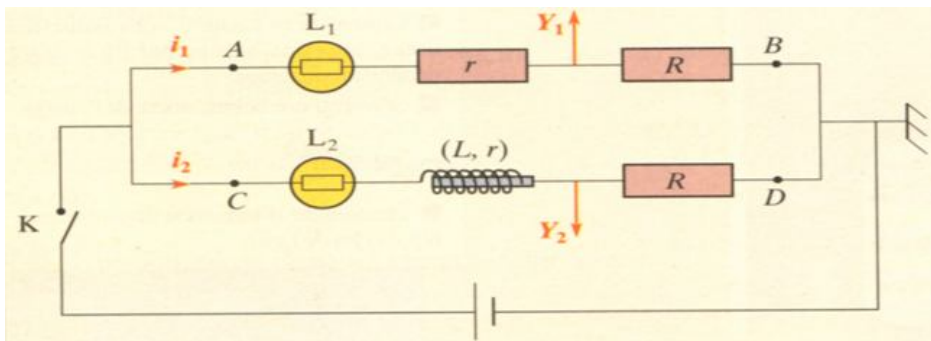


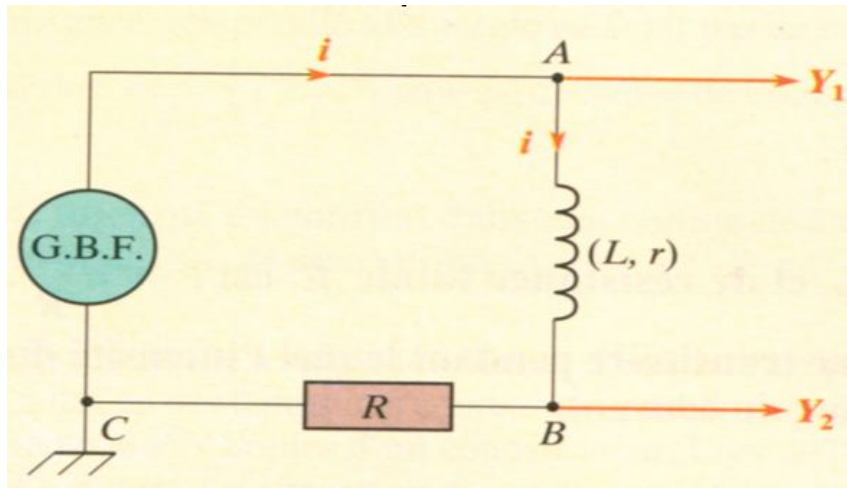
$$\begin{array}{rcl}
 U_{BD}=R_2 I_2 & U_{AD}=R_1 I_1 & - \\
 & I_1 & - \\
 U_{BD}=R_2 I_2 & U_{AD}=R_1 I_1 & - \\
 & I_2 & - \\
 & I_1 & - \\
 I_2 = -k \frac{\Delta I_1}{\Delta t} & & -
 \end{array}$$

التحريض الذاتي:

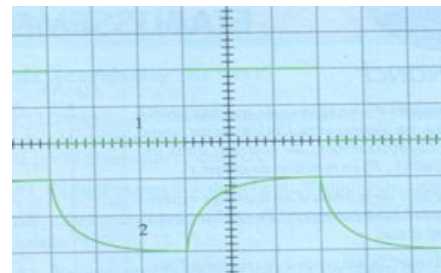
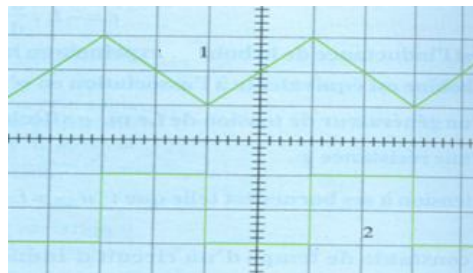
الهدف: إبراز ظاهرة التحريض الذاتي و التحقق من علاقة لنز-فرايدي $e = -L \frac{di}{dt}$.

$$\begin{array}{rcl}
 R=20\Omega & (0.2A \ 3.5V) & 6 \ V \quad GBF \\
 & R'=1000\Omega & \\
 & & \vdots
 \end{array}$$





R



$e = -L \frac{di}{dt}$

: 8 . + 8 . . .

- -	-	2 . .	-1
	- : () ...	1	
		1	
- -	-	2 . .	2- الصورة المعطاة من طرف عدسة
- -	- موضع وأبعاد صورة جسم بالنسبة لعدسة	1	
	-	1	
	- : .	2 .	
	-	1	3- نمذجة عدسة
	-	1	مقربة: العدسة الرقيقة
	- : -	2 . .	4- الضوء والحياة اليومية
	-	1	
	-	1	

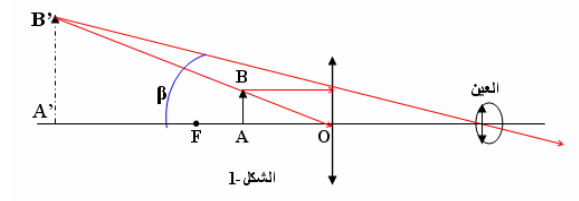
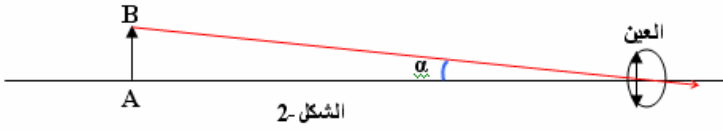
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:

.()

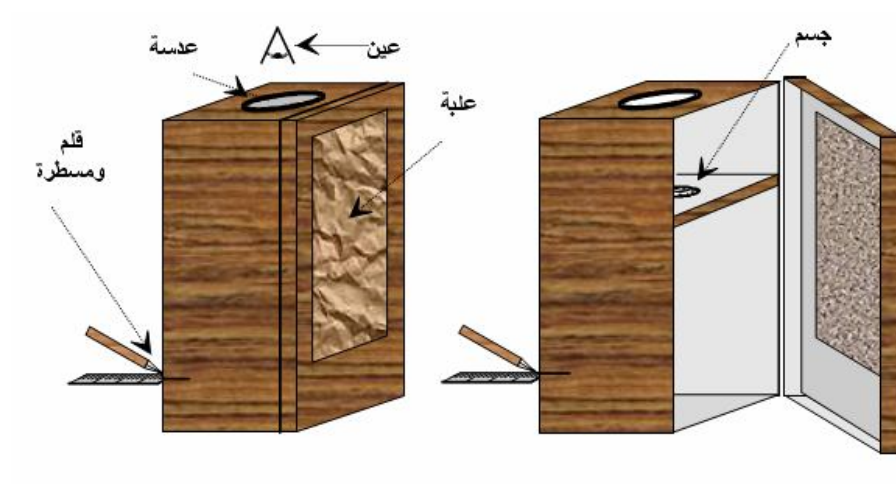
(G)

$$G = \frac{\beta}{\alpha} :$$

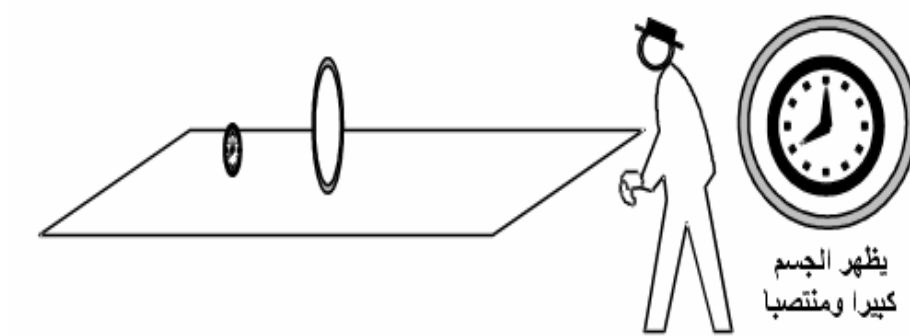


:1

()



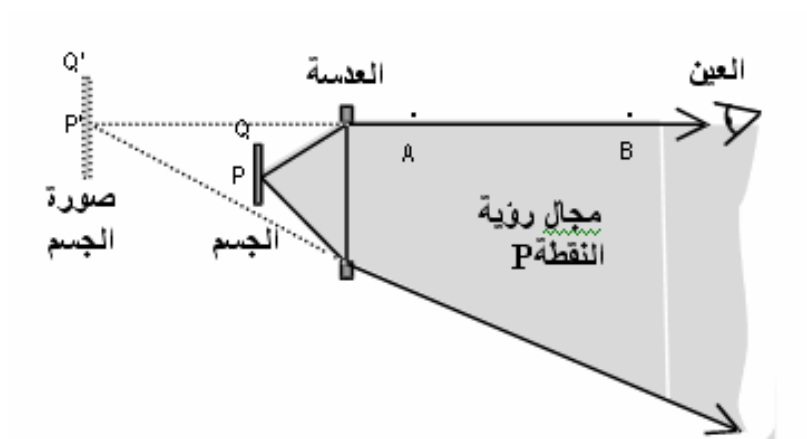
- ()
- 4.5v
- 5cm
- 10-5
- 5cm
- 2:
- (4-3)
- ()



(P) () (P')

(P)

(L)

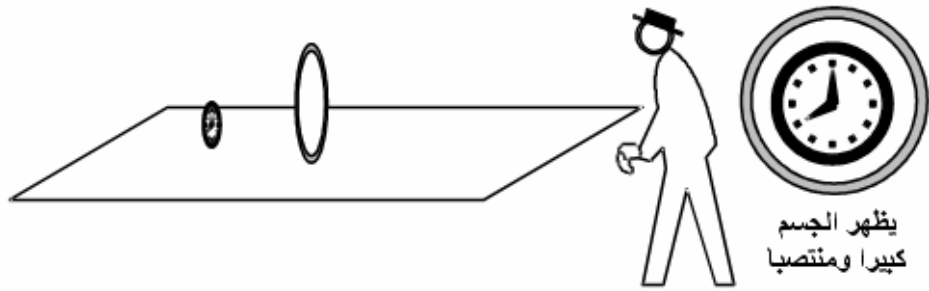


- -

:1

()

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الجسم

الجسم كما يظهر على مسافات مختلفة من العدسة منها

—

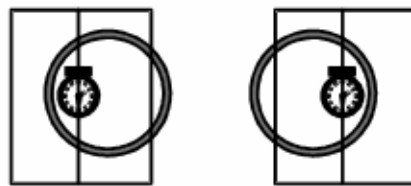
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الحالة الثانية الصورة في مستوى الخط الشبكي

:-

:2

(5-4)

:

:

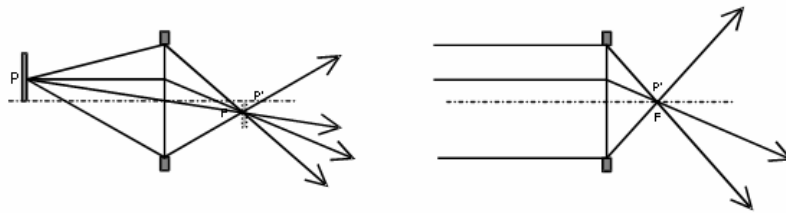
:

$$P' = 1/C \quad 1/P=0$$

P

(f)

(1/C)



(P)

(P')

:

: P

(P')

(f)

:

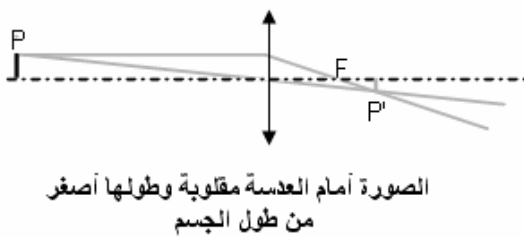
$$P < 2f$$



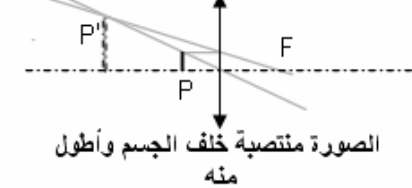
$$P = 2f$$



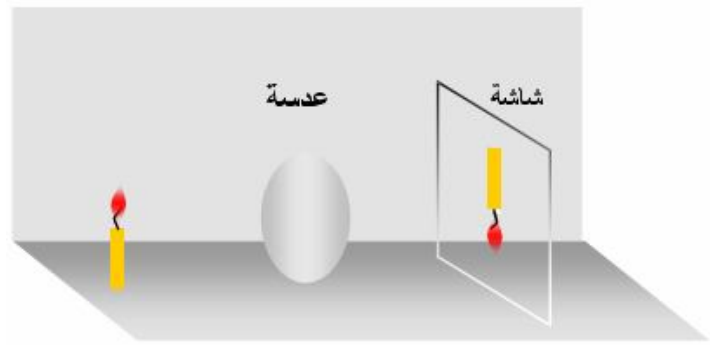
$$P > 2f$$



$$P < f$$



⋮



(8 + 18) _____

1 + 4	_____
1 + 4	_____
3 + 4	_____
3 + 6	_____

:

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▪ (

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(1 + 4) :

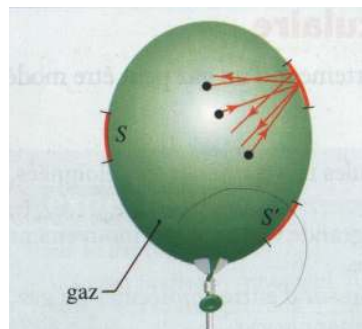
	-	
A1	-1	01
A2	-2	1
A3	-3	1
	-4	2
()A4	-5	1
		1

:
 :
 : - 1*
 : (

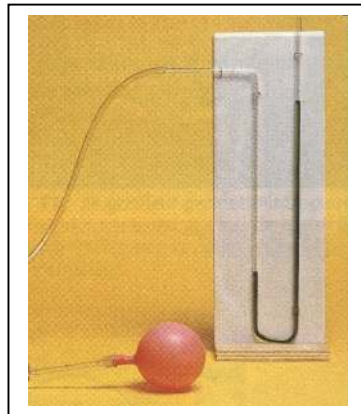
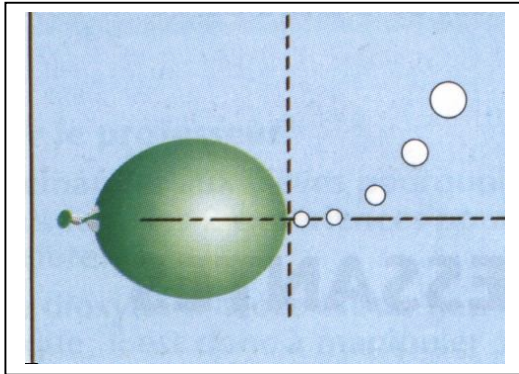
$$F \quad P = F/S$$

S
 : -(
 A1 :
 : 1

(Ballon de baudruche) (1



*
 *

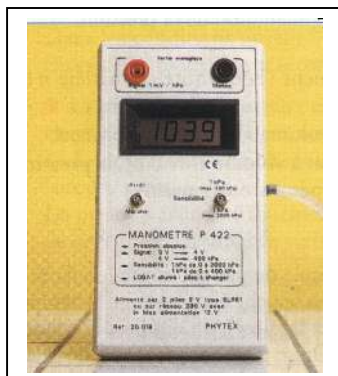


: 2

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U

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-1

-2

: 3

(

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(

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* *

.()
ZN)

(

- 2

: (

()

()

$$T(K) = \theta(^{\circ}C) + 273 \quad (K) \quad (C)$$

(

: A2

:

: : 1



(40° C)

:

(15° C)

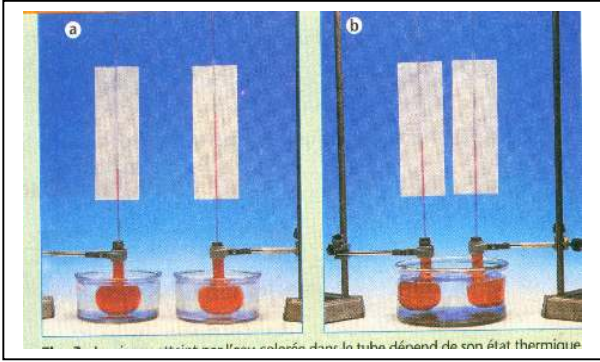
(05 C)

•

•

•

:2



03:

(thermomètre) /

) -

(

:

() : 04

3 - :

- :

(V,P T,n,)

)

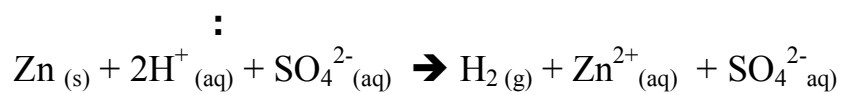
R PV=nRT

(P,T)

A4:



1. :



1

()

$$(n_{H_2} = n_{Zn})$$

:

:

(m₁)

250mL

(m₂)

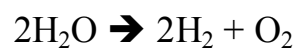
:

$$n_{Zn} = m_1 - m_2 / 65$$

$$V_{\text{molaire}} \xrightarrow{250\text{mL}} n_{H_2} \xrightarrow{1 \text{ mole } (H_2)} .2$$

30°C.

25 L



10 cm³

()

: _____

$$(M_{H_2} = 2g, M_{O_2} = 32g)$$

(25 L

30°C).

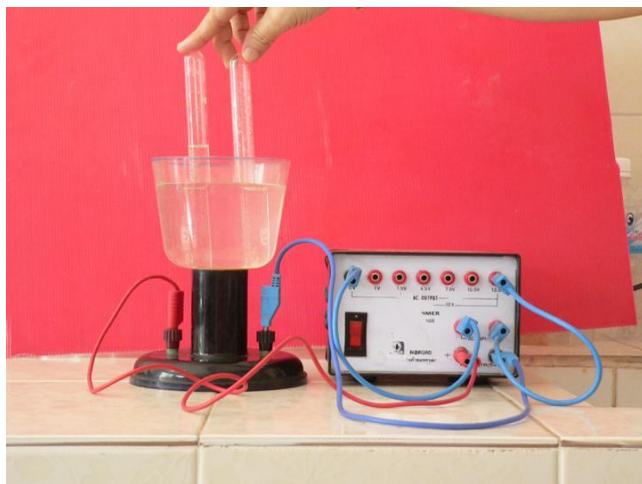
$$V_{\text{molaire}} = 22,4L/mol$$

: _____ : T P

: _____

()

()



(H₂ N₂ He)

(Cl₂ - CO₂)

$$n=V/V_m :$$

.

_____ :

60 mL

_____ :

-

() 30 mL

:

.

-

-

-

-

:

-

. 15 mL

()

-

() :

-

-

V(mL)						
P(hpas)						
P.V						

$$P= f(V)$$

-

)

-

.(

:-

-

-

()

PV = f(P) :

-

= P,V

:-

C D

$\vdots$ _____ $\vdots$
 $\vdots$
 ()
 .G

-1 _____ : (électrolyte)

$\vdots$ _____

(.....CaCl₂ NaCl :) ✓

.()

(..... HCl HCOOH) ✓

HCl H₂O

HCl H₂O HCl .

.

(Solvates)

C

.(X)

-2 _____ : (Conductance) G

-

$$G \quad G(S) \quad R(\Omega) \quad G = \frac{1}{R} \quad R$$

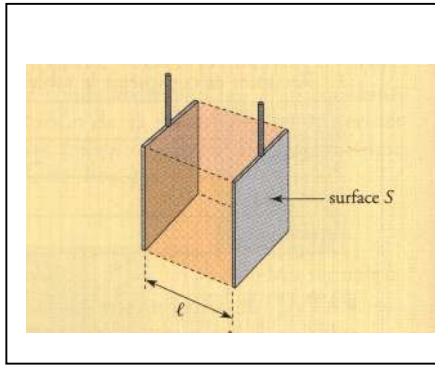
. (mS) Millisiemens:

- _____ :G

R .X⁻ M⁺

S L . ()

.



$$G = \frac{1}{R} = \frac{1}{e} \cdot \frac{S}{L} \Leftrightarrow R = e \cdot \frac{L}{S}$$

(Conductivité)

$$\partial = \frac{1}{e}$$

$$K = \frac{L}{S}$$

$$\partial = KG \Leftrightarrow$$

$$C \leq 10^{-2} \text{ mol} \cdot L^{-1}$$



$$\partial^- \quad \partial = \partial^+ + \partial^-$$



$$\lambda_L$$

$$\partial = \lambda_{M^+} \cdot [M^+] + \lambda_{X^-} [X^-] \quad \partial^- = \lambda_{X^-} [X^-] \quad \partial^+ = \lambda_{M^+} \cdot [M^+]$$

$$\sigma = \sum \lambda_i [X_i]$$



$$[M^+] = [X^-] = C$$

$$\partial = C(\lambda_{M^+} + \lambda_{X^-})$$

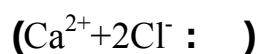
$$KG = C(\lambda_{M^+} + \lambda_{X^-}) \Leftrightarrow \partial = KG$$

$$G = \frac{(\lambda_{M^+} + \lambda_{X^-})}{K} \cdot C$$

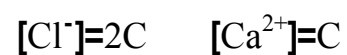
$$\Delta = (\lambda_{M^+} + \lambda_{X^-})$$

$$G = \frac{\Delta}{K} \cdot C$$

$$G = a \cdot C$$



:



$$\sigma = C(\lambda_{Ca^{2+}} + 2\lambda_{Cl^-})$$

✓

$$C = 10^{-2} \text{ mol} \cdot L^{-1} \quad S(n^2) \quad L(n) \quad :$$

$$1L = 10^{-3} m^3 : \quad = 10^{-2} \text{ mol} \cdot L^{-3}$$

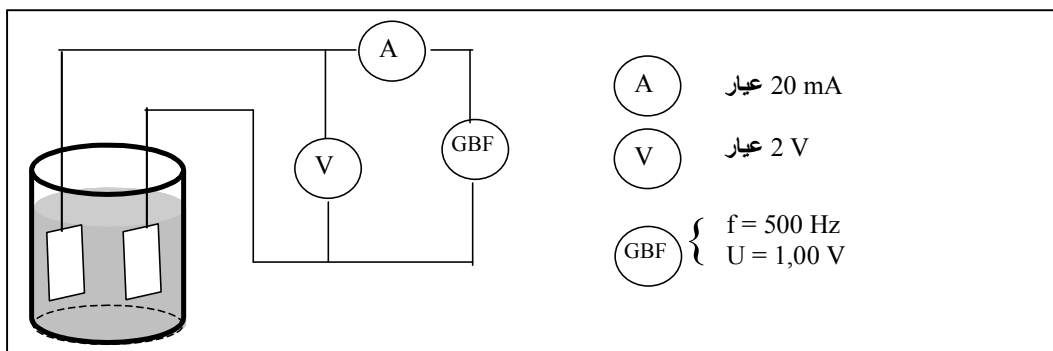
25°C

	$\lambda_i (mS \cdot m^2 \cdot mol^{-1})$		$\lambda_i (mS \cdot m^2 \cdot mol^{-1})$
H_{aq}^+	35,0	HO^-	19,9
Na_{aq}^+	05,0	Cl_{aq}^-	7,63
K_{aq}^+	7,35	Br_{aq}^-	7,81
NH_{4aq}^+	7,34	I_{aq}^-	7,14
Ag_{aq}^+	6,89	$M_n O_{4aq}^-$	6,13

:

-

:



$$(U_{eff} = 1,00V \quad f = 500 Hz \quad)$$

GBF

$$I_{eff}$$

$$G = \frac{I_{eff}}{U_{eff}}$$

$$G = I(Siemens) \Leftarrow U_{eff} = 1,00V$$

$$G = 0,01S \quad I = 0,01A$$

:

(Conductimètre)

:I _____ :

	-	
() A_1	-1	1
() A_2	-2	1
() () A_3	-3	1
TP	-4	(.) 2
	-5	1
	-6	1

: _____ :

: A_1 _____



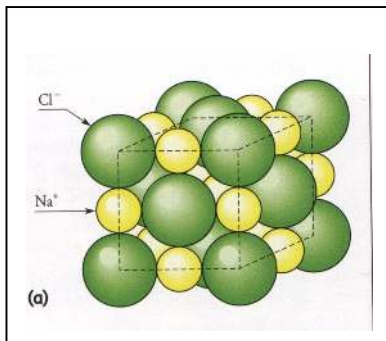
()

: 1

✓

✓

:2



▪

HCl

- 1 -

✓

✓

✓

:3_____

HCl

m

- 2 -

✓

✓

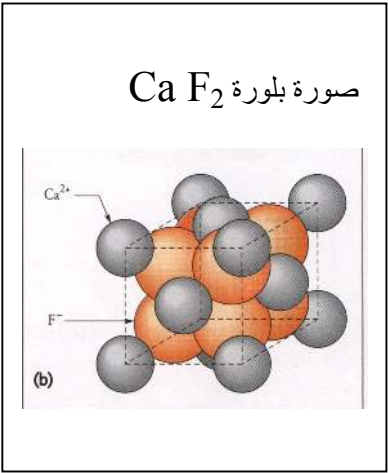
✓

HNO₃

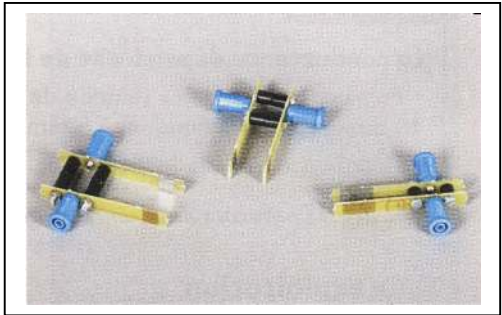
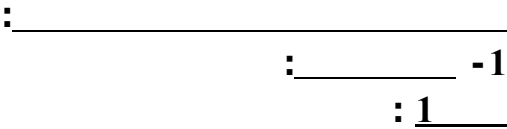
✓



4



5



: _____ -2

_____ 2

$$\theta_2 \quad \theta_1$$

($\theta_2 > \theta_1$)

_____ 3

$$C = 10^{-2} \text{ mol.L}^{-1}$$

: 4 _____

$$(S_2) \quad C_1 = 2,5 \cdot 10^{-2} \text{ mol.L}^{-1} \quad (S_1)$$

$$C_2 = 2,5 \cdot 10^{-2} \text{ mol.L}^{-1}$$

: G = F (C) **TP₂**

-1

	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀
mol.L ⁻¹	2	4	6	8	10	12	14	16	18	20
G(ms)										

• G -

) C G G = F (C) -

(

(S) C₀ S₀ -

$$C_0 \quad C = 10^{-2} \text{ mol.L}^{-1}$$

: -2

$$C = 10^{-2} \text{ mol.L}^{-1}$$

() -

$$\lambda_{Cl^-} \quad \lambda_{Na^+} \quad \lambda_{H^+} = 19,9 mS.m^2.mol^{-1}$$

$$\frac{\lambda_{Cl^-}}{\lambda_{Na^+}} = \frac{\lambda_{H^+}}{\lambda_{H^+}}$$

$$\lambda_{H^+} = \lambda_{H^+}$$

$$\lambda_{H^+} = \lambda_{H^+}$$

$$\lambda_{H^+} = \lambda_{H^+}$$

$$\lambda_{H^+} = \lambda_{H^+}$$

$$\lambda_{H^+} = \lambda_{H^+}$$

$$\lambda_{H^+} = \lambda_{H^+}$$

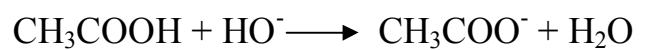
....

$$\rightleftharpoons = \text{IUPAC}$$

$$CH_3COOH = CH_3COO^- + H^+ \longrightarrow CH_3COOH / CH_3COO^- \quad *(1)$$

$$HO^- + H^+ = H_2O \quad H_2O / HO^- \quad *(2)$$

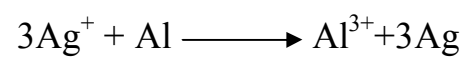
$$:$$



$$(Ag^+ + 1e^- = Ag) \quad Ag^+/Ag \quad *(3)$$

$$Al = Al^{3+} + 3e^- \quad Al^{3+}/Al \quad *(4)$$

$$:$$



: _____
 ()
 ()
 .
 : _____ *
 :
 (Titrant) *(1
 .V
 . V x max *(2
 . x max *(3
 .
 . *(4
 . (Titre) *(5
 :
 :
 . () -
 . -
 .

(TP 3 + 8) :

A1	$\begin{array}{c} \vdots \quad - \\ \quad \quad \quad / \\ (\quad \quad) \\ \quad \quad \quad \cdot \quad - \end{array}$	$\begin{array}{c} -1 \\ * \\ * \end{array}$ 1
A2	$\begin{array}{c} \vdots \\ \quad \quad \quad / \\ (\quad \quad) \\ \quad (\quad) \end{array}$	$\begin{array}{c} -2 \\ * \\ * \end{array}$ 1
TP1	$\begin{array}{c} \vdots \\ \quad \quad \quad \cdot \\ \cdot \quad \quad \quad \cdot \\ \quad \quad \quad \cdot \end{array}$	$\begin{array}{c} -3 \\ * \\ * \end{array}$ 2 TP1
TP2	$\begin{array}{c} \vdots \\ - \\ \cdot \quad G=f(V) \end{array}$	$\begin{array}{c} -4 \\ * \end{array}$ 2
PT3	$\begin{array}{c} \vdots \\ \cdot \quad G=f(V) \end{array}$	$\begin{array}{c} * \end{array}$ 2
A3	$\cdot$	2
	$\cdot$	2

: _____ :

: A1

/ : _____

: 1

(H-Cl) Cl , H

HCl

- 1

H ⁺ -2

-3

: 2

In⁻

HIn

.

1ml -1

. 3

.

()

5ml - 2

C₁=1,0.10⁻²mol. L⁻¹

.

()

2ml -3

،C₂=1,0.10⁻²mol. L⁻¹

.

.

-4

:A2 _____

: 1 -1

Cu

(Ag⁺_{aq} + NO₃_{aq})

.

-

Cu²⁺ Cu

-

: 2 - 2

Zn

II

Cu Cu²⁺

Cu²⁺ الى Cu

: _____ : TP1

Na⁺)

(H⁺ + Cl⁻)

: _____ * I

V

(+ OH⁻)

A

CA

Cb

*1

*2

V_B

*3

.(

)

*4

/

(équivalence)

Vég

*5

) Ca

.....

.(

VB

:

-II

(I₂ aq)

V₁

C₂

-1

-2

-3

S₂O₃²⁻ / S₄O₆²⁻

I₂ / I_{1K}

(

)

V₂

-4

V₂ aq

)

V₂ eq

-5

.(

— I —
:TP2

(TP1)

) G

(

$$G = f(V_B) = \frac{I_{\text{eff}}}{U_{\text{eff}}} \quad (1)$$

$$) V_{\text{Béq}} \quad (2)$$

$$\left(\frac{V_{\text{Béq}}}{V_{\text{Béq}} + V_{\text{Béq}} + V_{\text{Béq}}} \right) \quad (3)$$

$$n(\text{HO}^-) \quad (4)$$

$$n(\text{H}^+_{\text{aq}}) = f(\text{HO}^-)$$

$$n(\text{H}^+_{\text{aq}}) = g(\text{HO}^-)$$

$$n(\text{H}^+_{\text{aq}}) = h(\text{HO}^-)$$

$$n(\text{H}^+_{\text{aq}}) = T(\text{HO}^-)$$

$$\mathbf{G} = \mathbf{f}(\mathbf{V}_B)$$

$$\text{Cl}^-_{\text{aq}} \quad (\text{Na}^+)_{\text{aq}} \quad \text{HO}^-_{\text{aq}} \quad \text{H}^+_{\text{aq}} \qquad \vdots$$

-II

()

:A3

(logiciel approprié)

(dosage 1AS) Excel (1

(plein écran) " " (2

" (() () " "

C (3)

$$1.00 \text{ E-}^2 \quad \text{V}' \quad (\text{C} = 10^{-2} \text{ mol.L}^{-1})$$

$$C' \quad (V' = 10 \text{ ml} \quad)$$

(Afficher) (4

(Dosage automatique) (5

:

$$V_{eq} \quad V = V'_{eq}$$

:

(Sérum physiologique)

-1



G_o

C_o

(2

20

(3

$$C = C_o/20$$

$$C_1 = 1.0 \times 10^{-2} \text{ ml.L}^{-1}$$

$C_o \quad C$

(3 + 07)

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IUPAC

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(Craquage Catalytique)

(Reformage)

(Vapo craquage)

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$n \leq 6$

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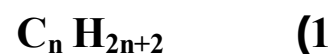
-

.(...)

IUPAC

_____:

$$n \leq 6$$



-

-

n	
01	(méthane)
02	(propane) (éthane)
03	(propane)
04	(butane)
05	(pentane)
06	(hexane)

() *



"yle " " ane "

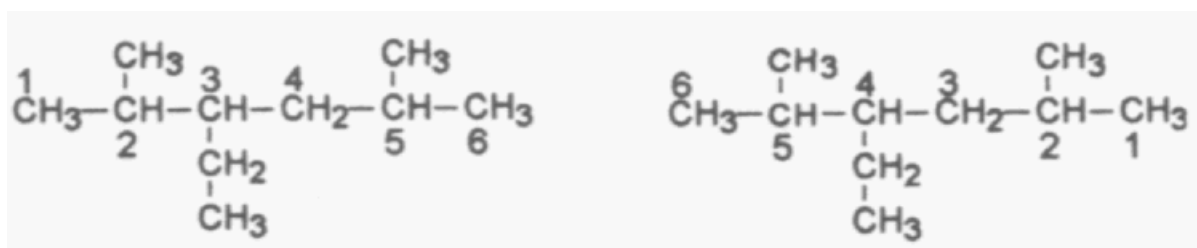


() -

CH ₃ -		Méthyl
CH ₃ -CH ₂ -	/	Ethyl-
CH ₃ -CH ₂ -CH ₂ -	/	Propyl-
$\begin{array}{c} \text{CH}_3-\text{CH}- \\ \\ \text{CH}_3 \end{array}$	Isopropyle	1- méthyléthyl-

✓

⋮



3- éthyl -2, 5 méthyl hexane (10=)

4- éthyl 2, 5 méthyl hexane (11=)

(alcènes)

"ane "

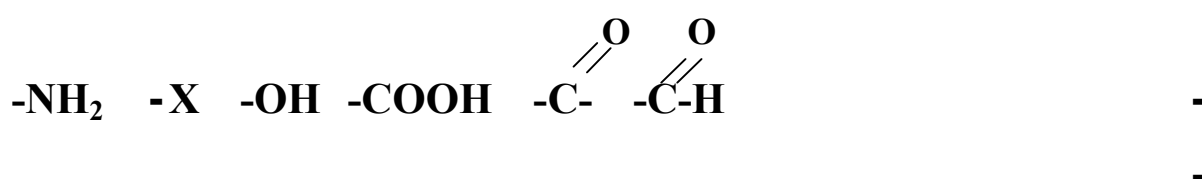
"ène "

Pent-2- ène



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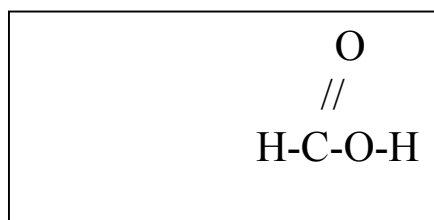
(2



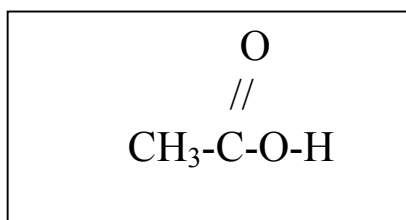
	-X	
	-COOH	Oique
	-COH	-aL
	-CO	-One
	-OH	-Ol
	-NH ₂	-Amine

:

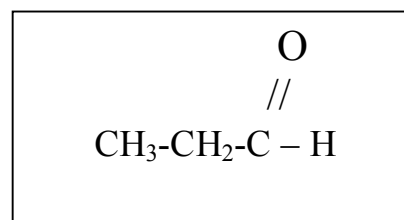
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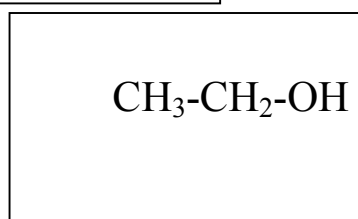
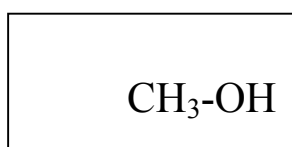
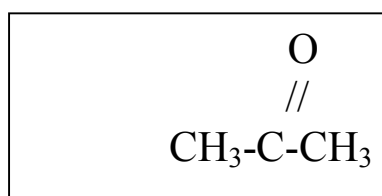
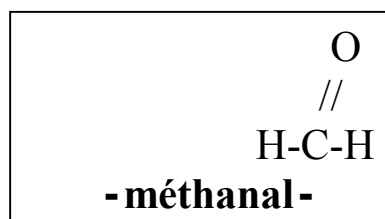
méthanoïque

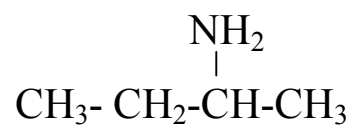
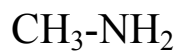


éthanoïque



propanoïque

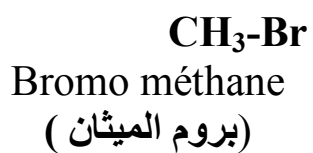
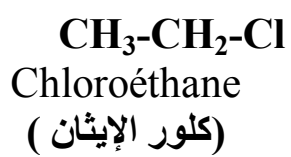




○ المشتقات الهالوجينية :

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ثانيا: إقتراح تدرج زمني

المدة	المحتوى – المفاهيم	النشاط
1 سا	1- الجانب التاريخي للكيمياء العضوية	نشاط A1
2 سا	2- التحليل الكيفي لنوع كيميائي عضوي	TP1
1 سا	3- السلاسل الفحمية المختلفة (الهيكل الفحمي): تصنيف الأنواع العضوية	A2
2 سا	4- التسمية النظامية حسب IUPAC للفحوم الهيدروجينية المشبعة وغير المشبعة (.....) التمثيل البيولوجي	A3
2 سا	العائلات الأخرى: المجموعة المميزة – الكشف عن بعض أنواع الأنواع الكيميائية- تأثير السلاسل الفحمية على الخصائص الفيزيائية.....	A4
2 سا	المرور من مجموعة إلى أخرى نزع الماء من الكحول أكسدة الكحول المرور من الكحول إلى المشتق الهالوجي	TP2
2 سا	البتترول ومشتقاته أهم العمليات التي تجري للبتترول والفحم أهمية المشتقات البترولية في الصناعة	TP3
1 سا	تقويم الوحدة	

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(urée)

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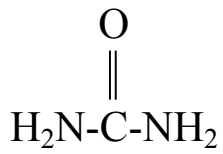
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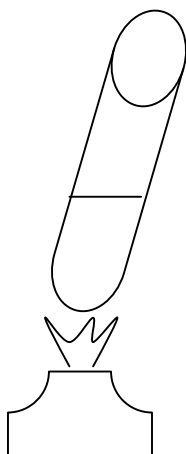
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(Textile)	(Indigo)	
(Santé)		
(Hygiène)		

TP1:

1:

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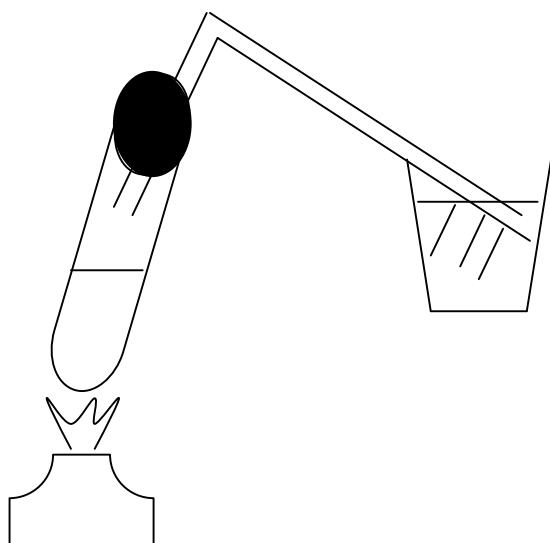
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(CuO)



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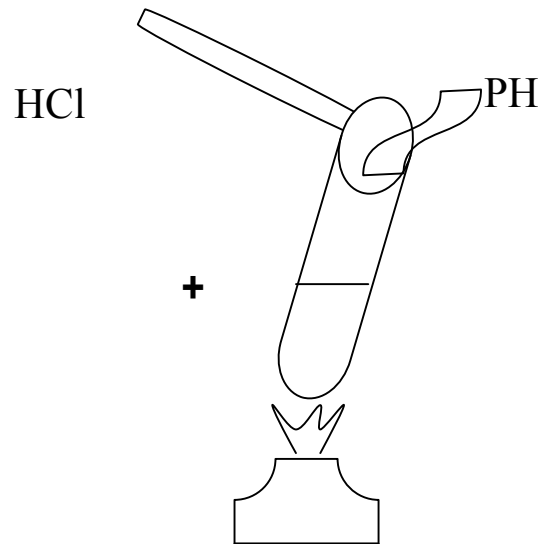
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" urée"

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G.P.L

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.(C₂H₂)

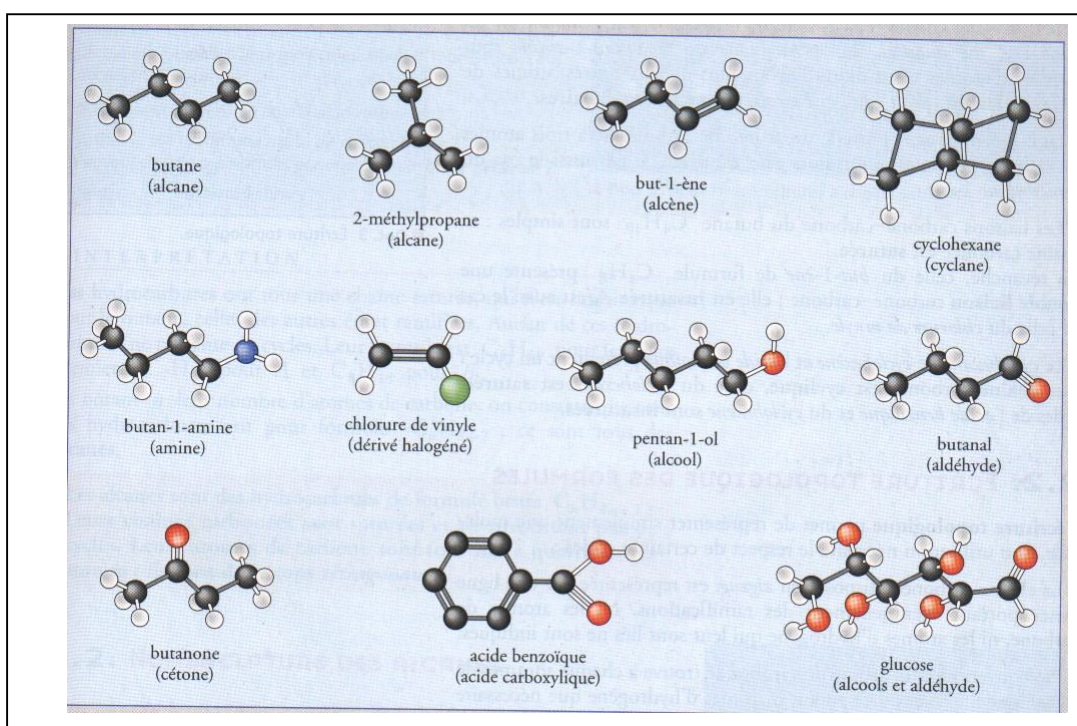
(C₂H₄)

(C₂H₆)

H, C

C-C

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TOPOLOGIQUE

H

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EN ZIGZAG

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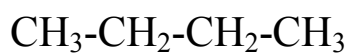
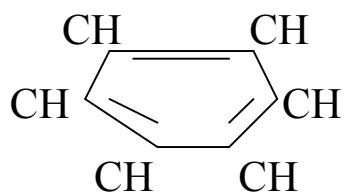
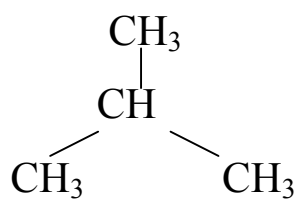
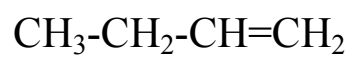
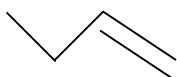
CC

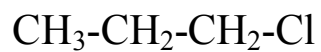
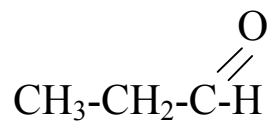
H

Cl O

C H

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: A₄ _____

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5 ml

3

Hexan-1-ol

Propan-2-ol

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-

:

Ethanol	0.78
Propan-2-ol	0.81
Hexan-1-ol	0.82

(2

P=1.013 bar

		R-Cl	R-OH
Méthane	-131.7	-24	65
Éthane	-88.6	12	78
Propane	-42.1	47	97
Butane	-0.5	78	107
Pentane	36.1	108	138
Hexane	68.7	131	158

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θ n $\theta = f(n)$ (3

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▪ Hexan-1-ol Hexane (4

⋮ _____ ⋮ **TP2**

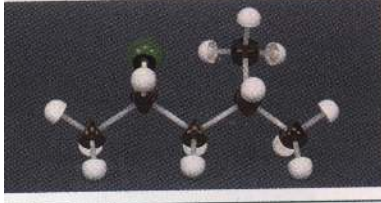
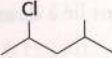
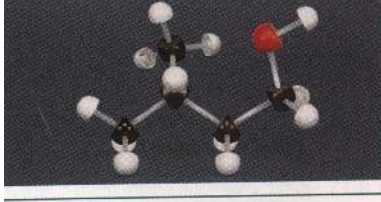
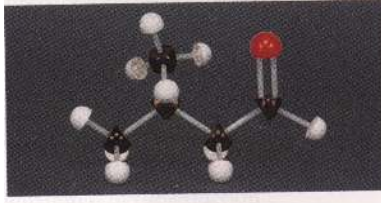
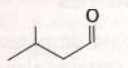
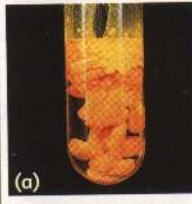
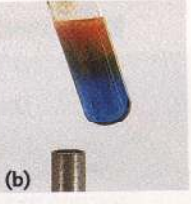
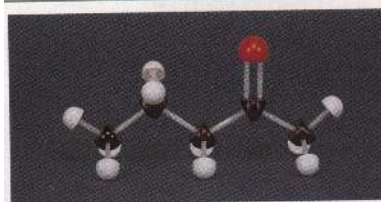
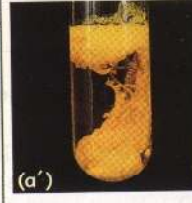
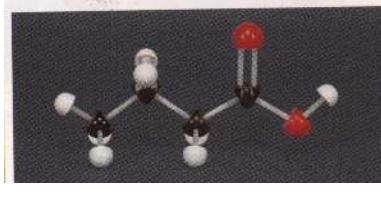
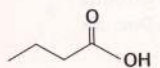
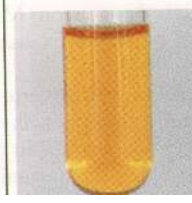
:1

2Méthylpropan-2- 25mL

(10min) () ol

(1

(2

	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH}_2 - \text{CH} - \text{CH}_2 - \text{NH}_2 \end{array}$  2-méthylbutylamine	 Les amines sont des bases ; elles font bleuir le bleu de bromothymol.
	$\begin{array}{c} \text{Cl} \qquad \qquad \text{CH}_3 \\ \qquad \qquad \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH} - \text{CH}_3 \end{array}$  2-chloro-4-méthylpentane	 Les composés halogénés donnent, avec les ions argent Ag^+, un précipité d'halogénure d'argent AgX.
	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{CH}_2 - \text{OH} \end{array}$  3-méthylbutan-1-ol	 Certains alcools réagissent avec une solution acidifiée de permanganate de potassium.
	$\begin{array}{c} \text{CH}_3 \\ \\ \text{CH}_3 - \text{CH} - \text{CH}_2 - \text{C} = \text{O} \\ \\ \text{H} \end{array}$  3-méthylbutanal	  (a) (b)
	$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{C}(=\text{O}) - \text{CH}_3$  pentan-2-one	 (a')
	$\begin{array}{c} \text{O} \\ \\ \text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{C} \\ \\ \text{O} - \text{H} \end{array}$  acide butanoïque	 Les solutions aqueuses d'acides carboxyliques sont acides, elles font jaunir le bleu de bromothymol.

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_____ -2

:(_____):

1 ml

Propan-1-ol

1 ml

3

2-Methylpropan-2-ol

1 ml

Propan-2-ol

2 ml

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:(_____):

6 ml

(

_____) : TP3

:(_____

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CH₄)

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craquage

reformage catalytique

catalytique