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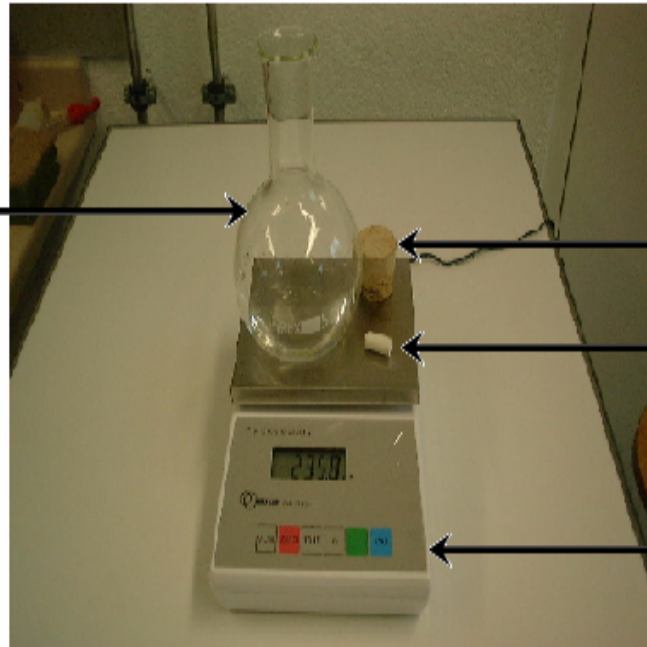
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(Lavoisier) _____

:

وعاء به مادة
حمض كلور الماء الممدد

سدادة

قطعة طباشور
(فحمات الكالسيوم)

إن الكتروني

الميزان يشير إلى

235.8 g



غليان داخل الوعاء
و اختفاء
قطعة الطباشير

الميزان يشير دوما إلى 235.8 g

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المتفاعلات



النواتج

يعني (تحولت إلى)

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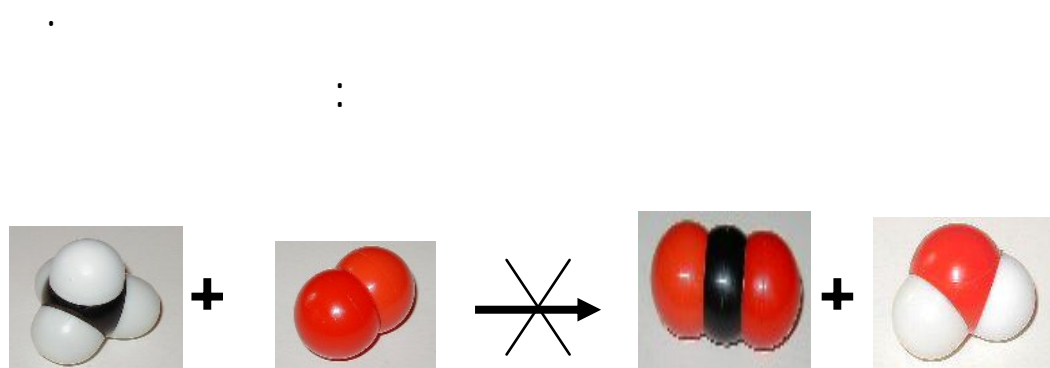
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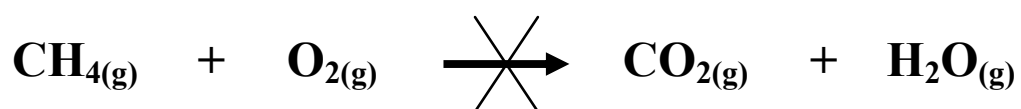


ميثان

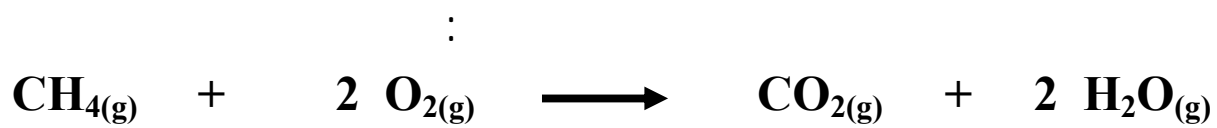
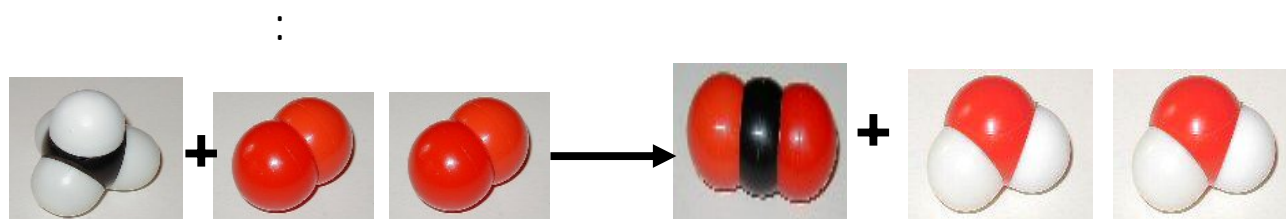
أكسجين

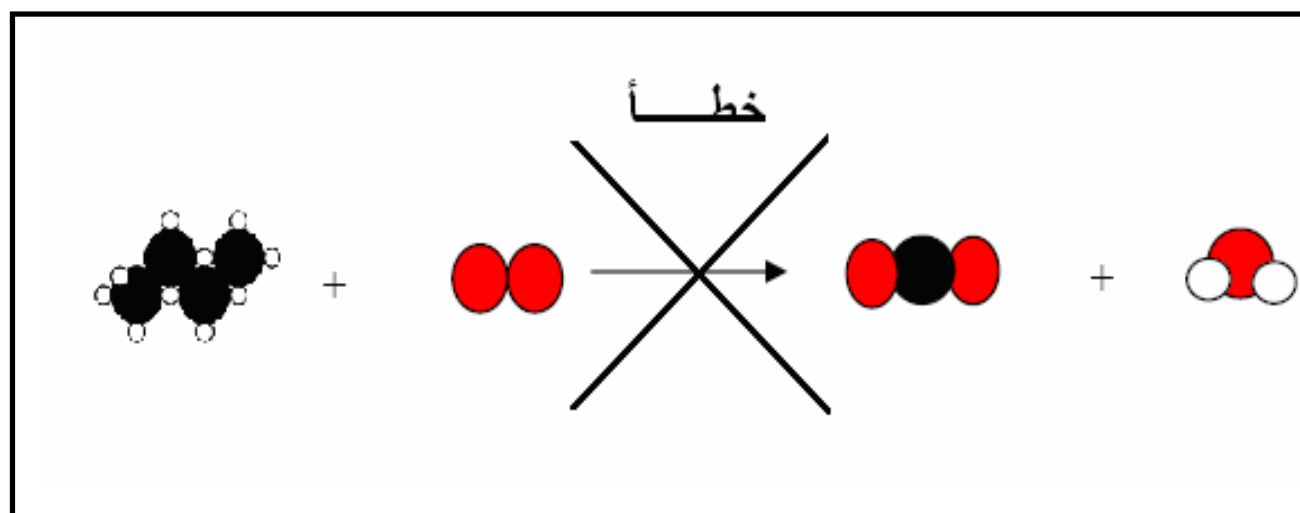
ثاني أكسيد الكربون

ماء

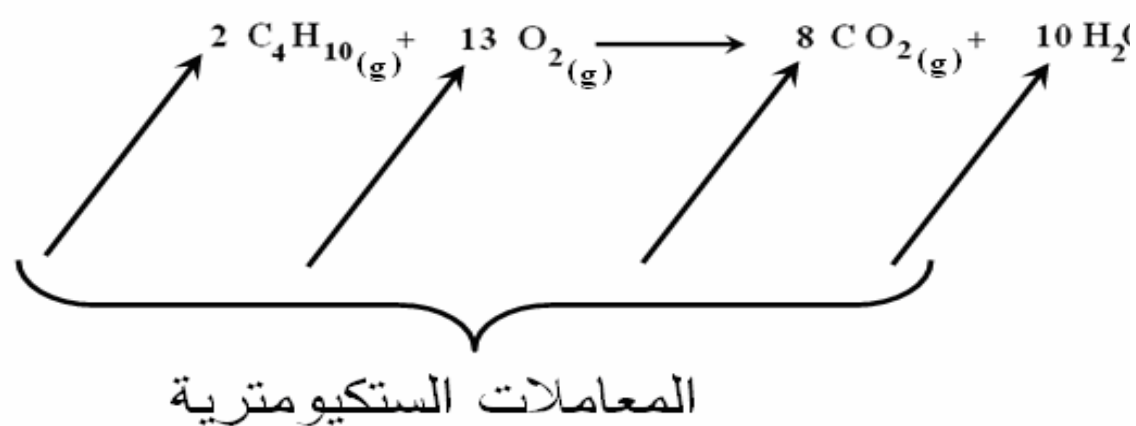


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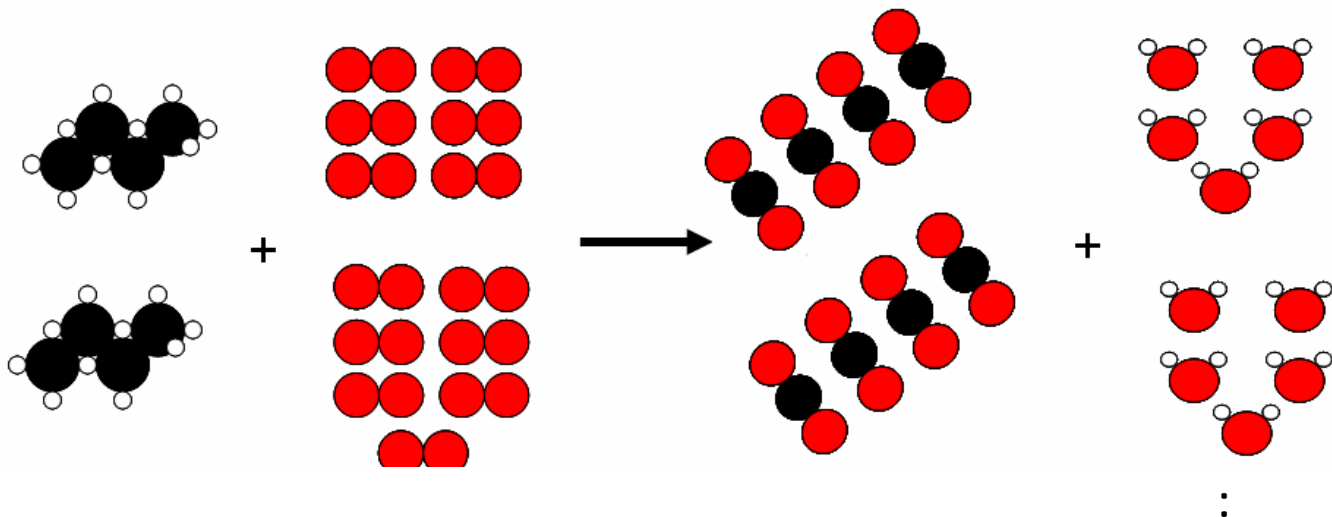




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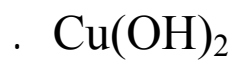
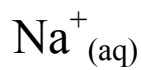
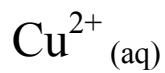
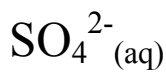
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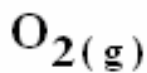
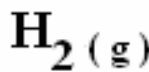
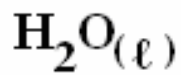
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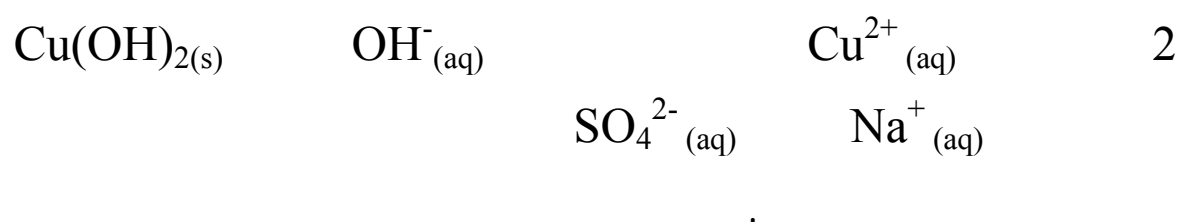
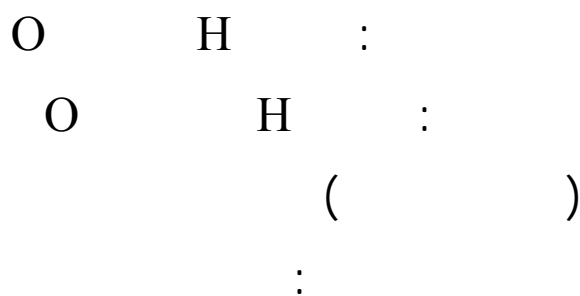
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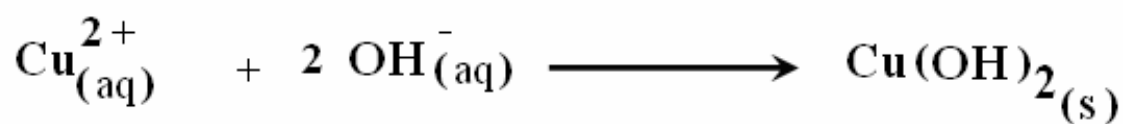
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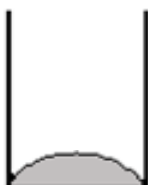
. : 2

. (rame) : 3

:



12 g
كربون



56 g
برادة الحديد



18 g
ماء

!!!

600.000

. (10^{-10} m)

!!!

(mol) . ($6,02 \cdot 10^{23}$)

!!

10

!!!

2

(mol)

 $6,02 \cdot 10^{22}$

()

. N_A

"

"

1

1 mol $\xrightarrow{\text{تحتوي على}}$ $6,02 \cdot 10^{23}$ ذرة فحم
(C) من ذرات الفحم

: 2

1 mol $\xrightarrow{\text{تحتوي على}}$ $6,02 \cdot 10^{23}$ جزيء ماء
(H_2O) من جزيئات الماء

3

1 mol $\xrightarrow{\text{تحتوي على}}$ $6,02 \cdot 10^{23}$ شاردة نحاس
(Cu^{2+}) من شوارد النحاس

:

. (mol) (n)

:

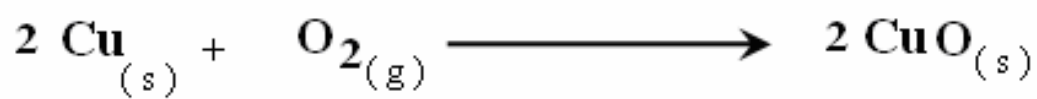
:

1

2

:

:



.

1 mol

2 mol

2 mol

.

:

.(M)

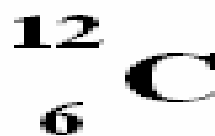
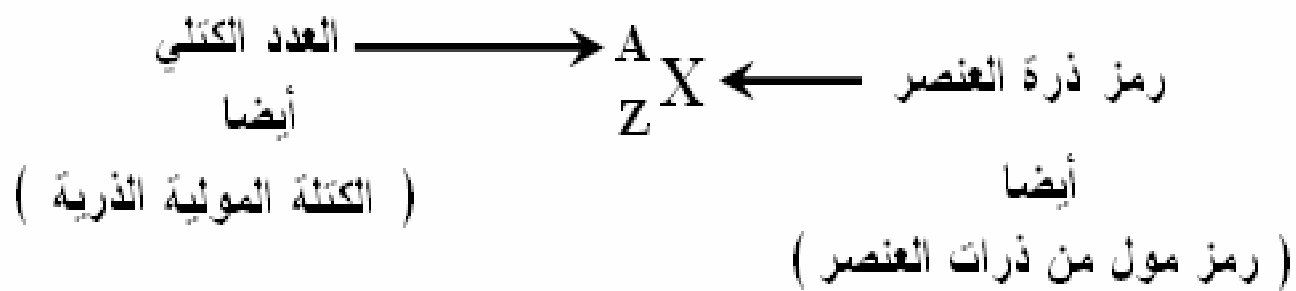
(g/mol)

. () A

"

"

:



12 g / mol ()

:

	H	C	N	O
	1	12	14	16

: _____

(g/mol)

. M

:

: _____

(C₄H₁₀)(CH₄)(CO₂)(H₂O)

: _____

H : 1 , C : 12 , O : 16

:

$$M_{\text{H}_2\text{O}} = (2 \times 1) + 16 = 18 \text{ g/mol}$$

$$M_{\text{CO}_2} = 12 + (2 \times 16) = 44 \text{ g/mol}$$

$$M_{\text{CH}_4} = 12 + (4 \times 1) = 16 \text{ g/mol}$$

$$M_{\text{C}_4\text{H}_{10}} = (4 \times 12) + (10 \times 1) = 58 \text{ g/mol}$$

:

: (m) (n)

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

. () g m

3 g :

12 g/mol :

$$\mathbf{n} = \frac{\mathbf{3}}{\mathbf{12}}$$

أي

$$\mathbf{n} = \mathbf{0,25 \ mol}$$

:

1 mol

V

: V_m

$$n = \frac{V}{V_m}$$

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

: _____

0° C

1 atm :

(Cl₂)

25,76 L

:

:

:

$$n = \frac{V}{V_m}$$

$$n = \frac{25,76}{22,4}$$

أي

$$n = 1,15 \text{ mol}$$

: (C)

.

mol / L

.

:

$$C = \frac{n}{V}$$

2 L (NaCl) 0,1 mol : 1

.

C

:

:

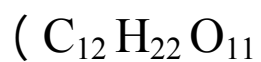
$$C = \frac{n}{V}$$

$$C = \frac{0,1}{2}$$

أي

$$C = 0,05 \text{ mol / L}$$

) 11,9 g : 2



500 mL

1

2

3

:

$$M = (12 \times 12) + (22 \times 1) + (11 \times 16) = 342 \text{ g/mol}$$

1

:

2

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

$$n = \frac{11,9}{342}$$

أي

$$n = 0,035 \text{ mol}$$

1 _____ 2

: 3

$$C = \frac{n}{V}$$

$$C = \frac{0,035}{0,5}$$

أي

$$C = 0,07 \text{ mol / L}$$

: 4 2

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1 _____ 2

: _____ **III**

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: **2**

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. Cu(OH)_{2(s)}

.

: **3**

:

20 mL

0,1 mol/L

-

20 mL

-

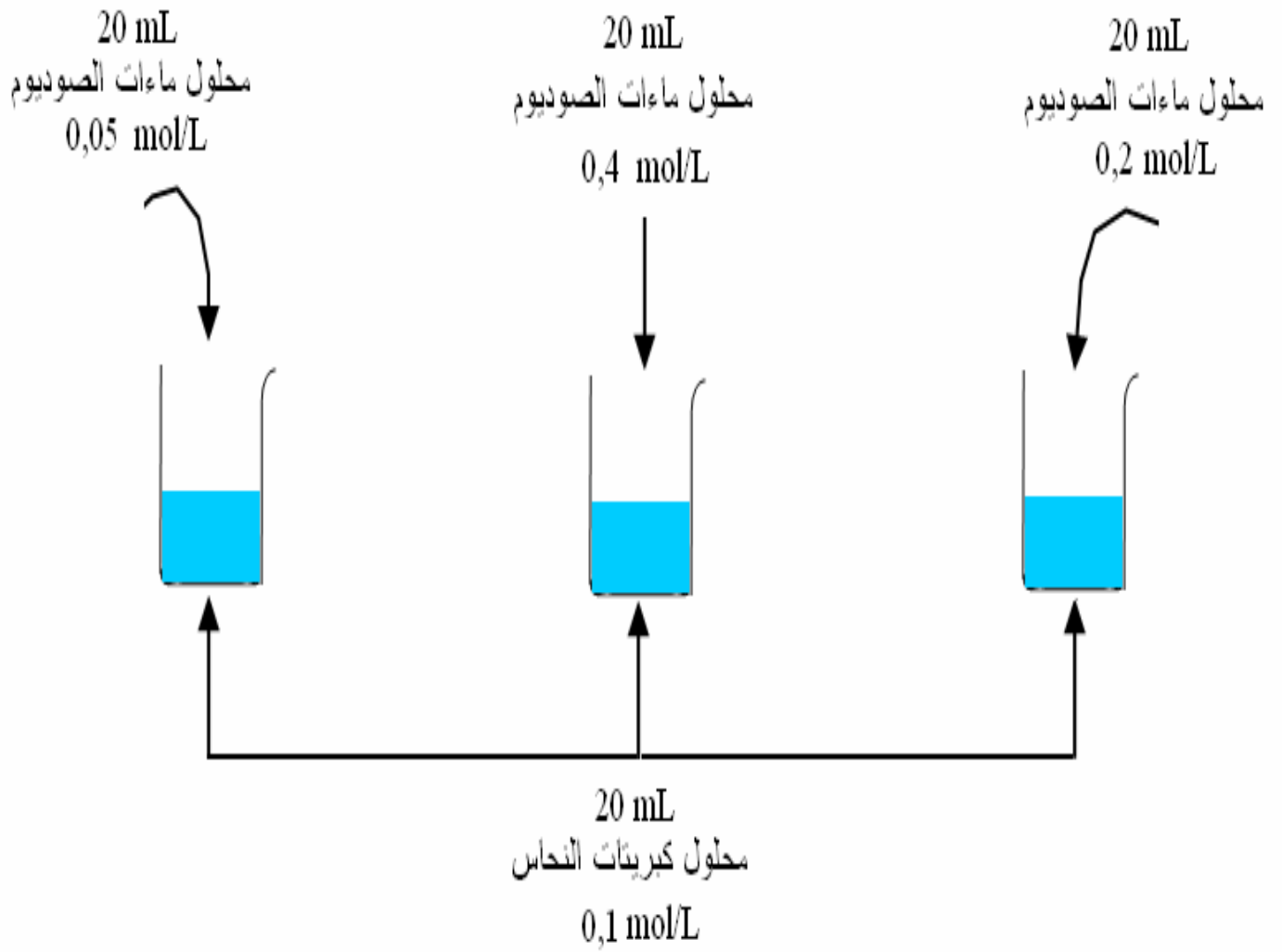
0,2 mol/L

0,4 mol/L

0,05 mol/L :

()

:



2 mL

:

1

2

()

2 mL

()

2 mL

.

:

3**2****1**

3	2	1	

-

:

(mol)

1**2****3** $\text{Cu}^{2+}_{(\text{aq})}$ $\text{OH}^{-}_{(\text{aq})}$

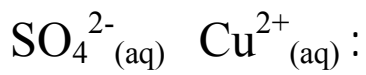
(mol)	1	2	3
$\text{Cu}^{2+}_{(\text{aq})}$			
$\text{OH}^{-}_{(\text{aq})}$			

: _____

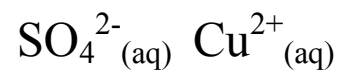
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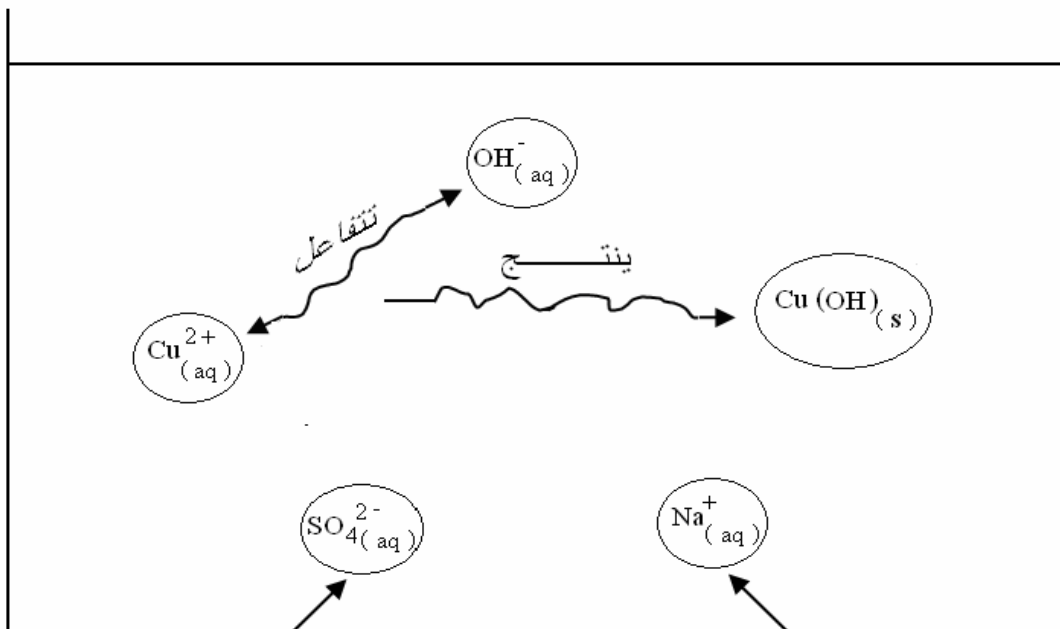
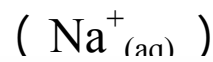
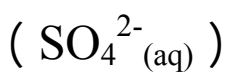


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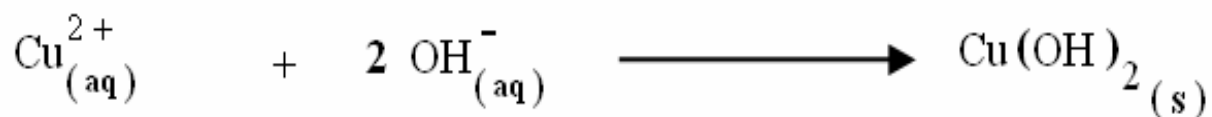
-

:



لا تتفاعل

:



:

3

: 0,1 mol / L

20 mL

100 m L

20 m L

:

100 m L

.

:

$$C = \frac{n}{V}$$

$$\Rightarrow n = C \cdot V$$

بالتعويض نجد

$$n = 0,1 \times 100 \cdot 10^{-3}$$

$$n = 10^{-2} \text{ mol}$$

:

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

$$\Rightarrow m = n \cdot M$$

(CuSO₄ , 5H₂O)

:

:

$$M = (63,5) + (32) + (4 \times 16) + 5 \times (2 \times 1 + 16)$$

$$M = 249,5 \text{ g/mol}$$

:

$$m = 10^{-2} \times 249,5$$

$$m \approx 2,5 \text{ g}$$

2,5 g

. 100 m L

:



(1)

(2)

(3)

3

2

1

:

-

$$C = \frac{n}{V}$$

$$\Rightarrow n = C . V$$

:

(mol)	1	2	3
Cu ²⁺ _(aq)	2 .10 ⁻³	2 .10 ⁻³	2 .10 ⁻³
OH ⁻ _(aq)	10 ⁻³	8 . 10 ⁻³	4 . 10 ⁻³

:_____

(3)

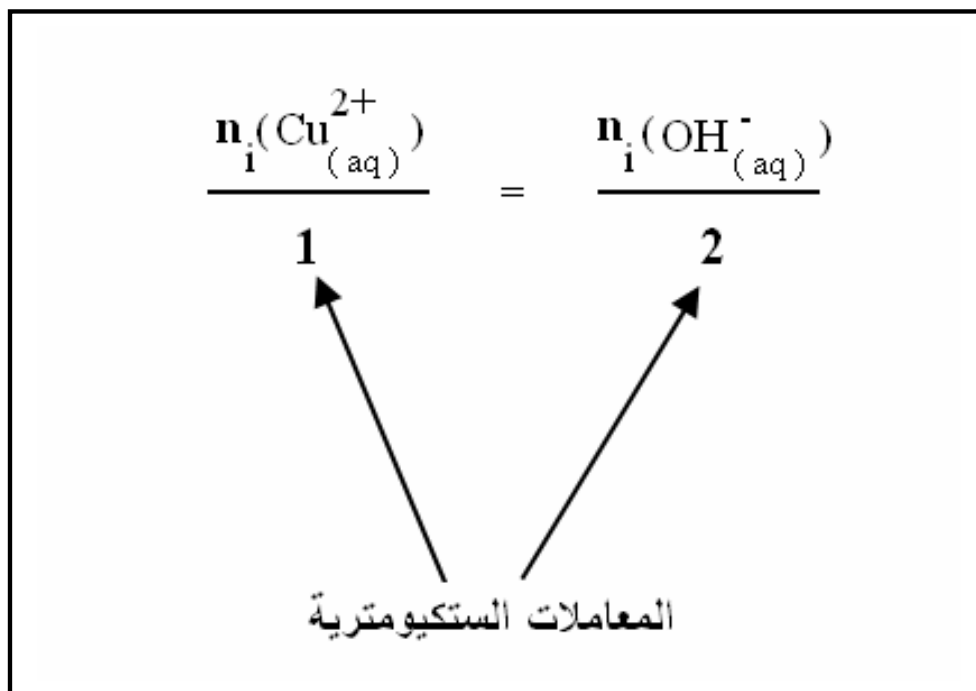
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(3)

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$n_i(\text{A})$	a	A
$n_i(\text{B})$	b	B
$n_f(\text{C})$	c	C
$n_f(\text{D})$	d	D



1 _____ 2

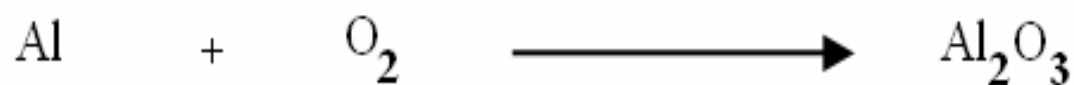
:

$$\frac{\mathbf{n_i(A)}}{\mathbf{a}} = \frac{\mathbf{n_i(B)}}{\mathbf{b}} = \frac{\mathbf{n_f(C)}}{\mathbf{c}} = \frac{\mathbf{n_f(D)}}{\mathbf{d}}$$

: _____

.

	:	1
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	:	2
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.....	-
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	:	3



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	المتفاعلات	النواتج
أسماء الأجسام	→	
النموذج الجزيئي	→	
معادلة التفاعل	→	

. (NH₃)

2 mol

(H₂)

H : 1 , N : 14 :

1

-

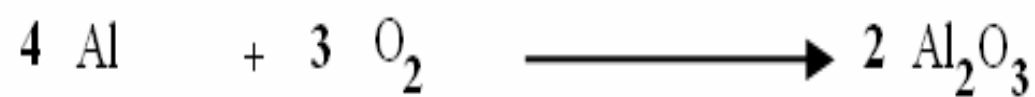
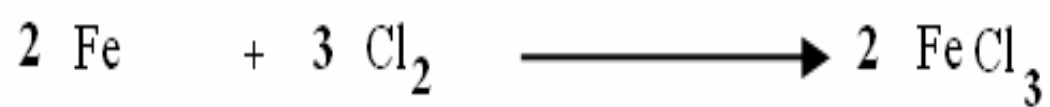
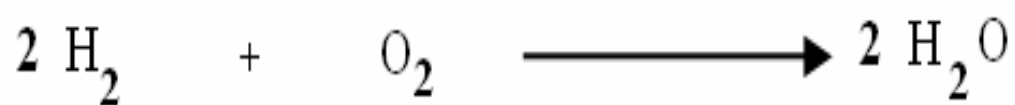
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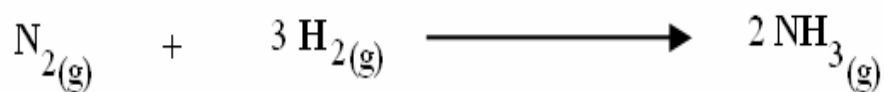
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	المتفاعلات	النواتج
أسماء الأجسام	كربون + ثنائي الأوكسجين →	غاز الفحم
النموذج الجزيئي	 +  → 	
معادلة التفاعل	$C_{(s)} + O_{2(g)} \longrightarrow$	$CO_{2(g)}$

:

-

: (H₂)

-

:

$$\frac{n_i(\text{N}_2)}{1} = \frac{n_i(\text{H}_2)}{3} = \frac{n_f(\text{NH}_3)}{2} :$$

$$\frac{n_i(\text{N}_2)}{1} = \frac{n_i(\text{H}_2)}{3}$$

بالتعويض

$$\frac{2}{1} = \frac{n_i(\text{H}_2)}{3}$$

أي :

$$n_i(\text{H}_2) = 6 \text{ mol}$$

:-

$$\frac{n_i(\text{N}_2)}{1} = \frac{n_f(\text{NH}_3)}{2}$$

و منه

$$n_f(\text{NH}_3) = 2 \cdot n_i(\text{N}_2)$$

أي

$$n_f(\text{NH}_3) = 2 \times 2$$

$$\Rightarrow n_f(\text{NH}_3) = 4 \text{ mol}$$

لكن

$$m = n \cdot M$$

بالتعويض

$$m = 4 \times 17$$

حيث الكتلة المولية الجزيئية للنشادر

$$M = (14) + (3 \times 1)$$

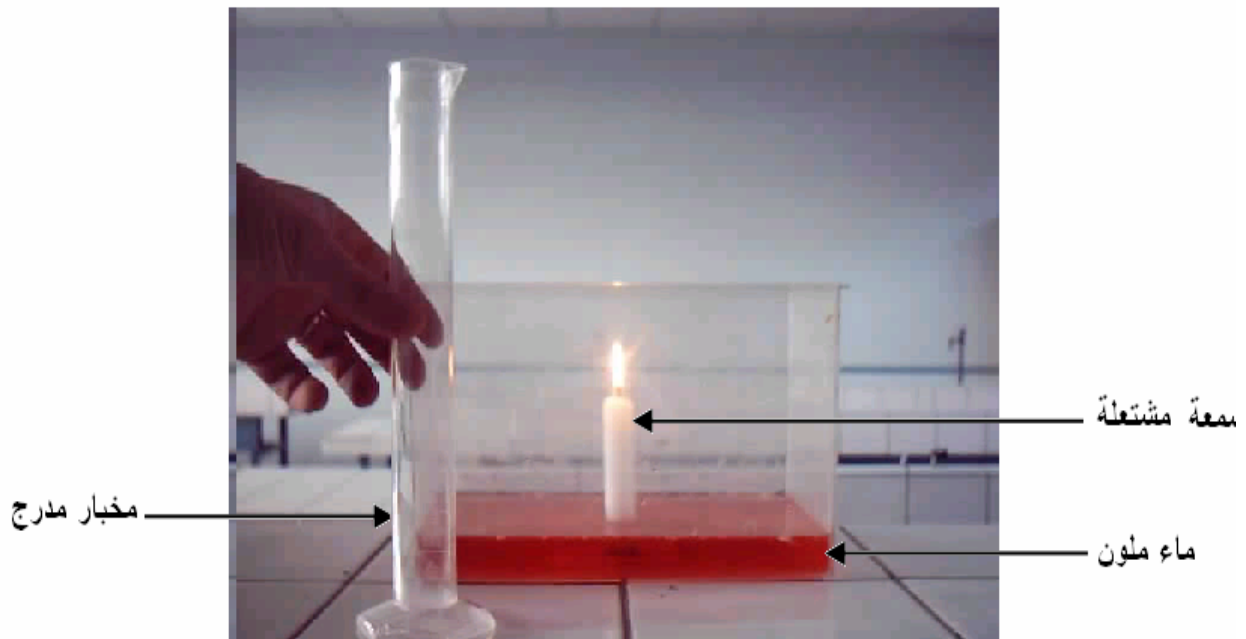
$$M = 17 \text{ g/mol}$$



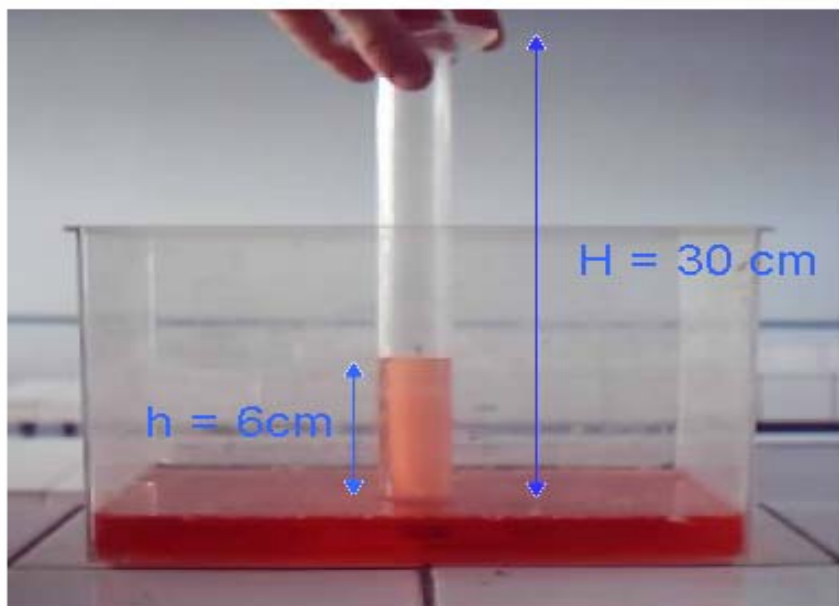
$$m = 68 \text{ g}$$

3 :

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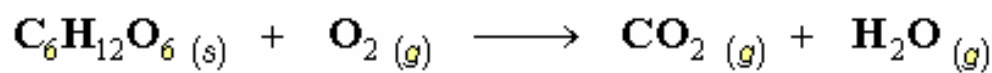
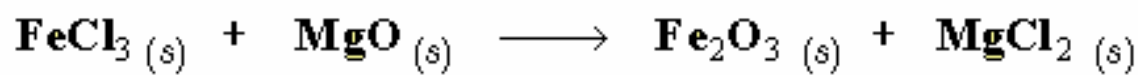
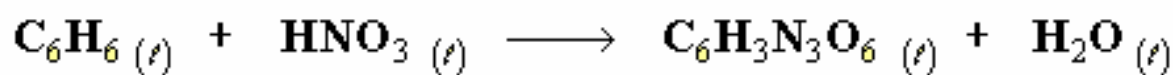
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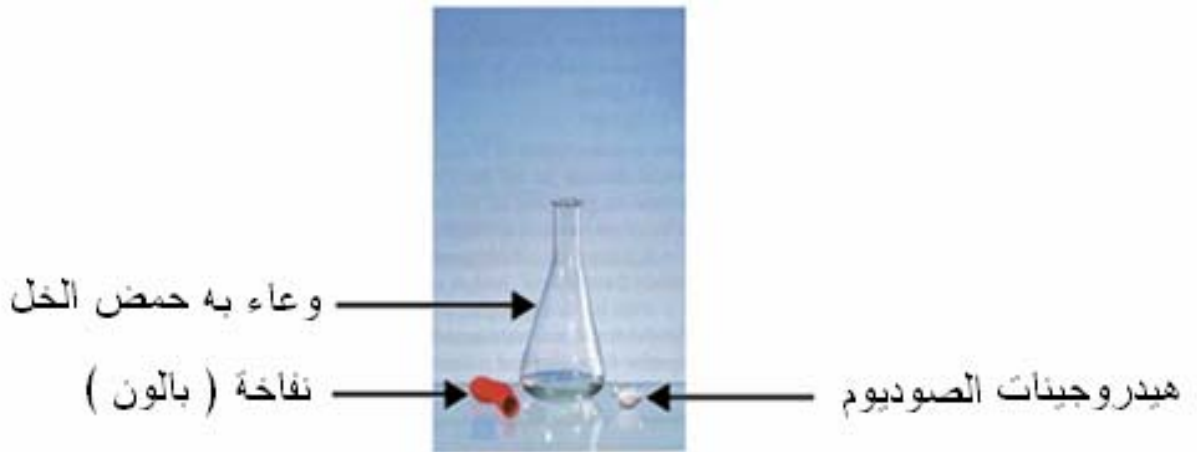
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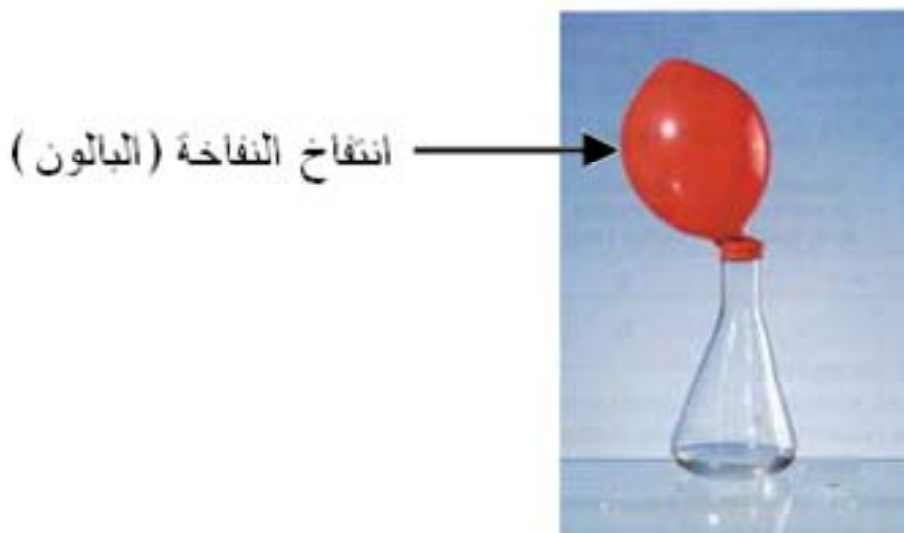


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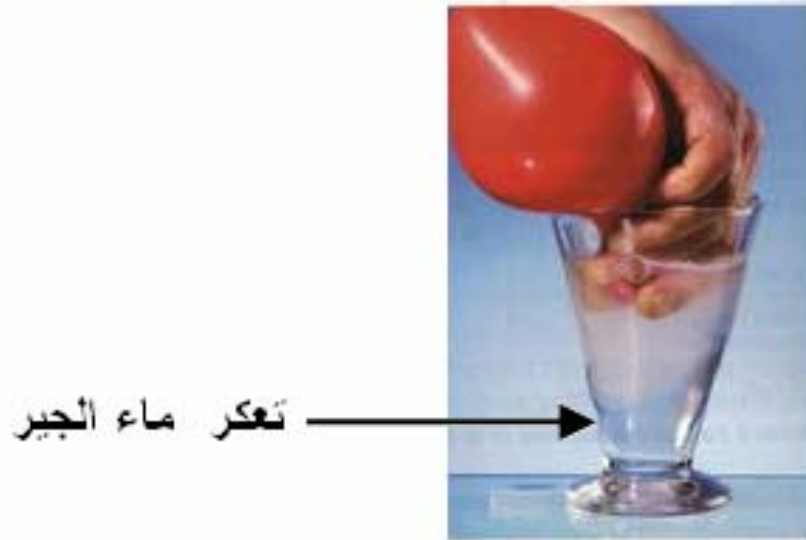


1

() NaHCO_3 CH_3COOH 

2

.



3

:

1

2

3

4

5

6

.

.()

:

