

$$\begin{aligned}
 \textcircled{1} \quad 30 \text{ hm} & \frac{10^2 \text{ m}}{1 \text{ hm}} = 3000 \text{ m} \\
 600 \text{ ns} & \frac{10^{-9} \text{ s}}{1 \text{ ns}} = 6 \cdot 10^{-7} \text{ s} \\
 8 \text{ Gm} & \frac{10^9 \text{ m}}{1 \text{ Gm}} = 8 \cdot 10^9 \text{ m} \\
 5000 \mu\text{A} & \frac{10^{-6} \text{ A}}{1 \mu\text{A}} = 5 \cdot 10^{-3} \text{ A} \\
 15 \text{ dies} & \frac{1 \mu\text{A}}{24 \text{ h}} \frac{3600 \text{ s}}{1 \text{ h}} = 1.296.000 \text{ s}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{2} \quad 4 \cdot 10^5 \text{ mm} & \frac{10^{-3} \text{ m}}{1 \text{ mm}} \frac{1 \text{ km}}{10^3 \text{ m}} = 0.4 \text{ km} \\
 300 \text{ ms} & \frac{10^{-3} \text{ s}}{1 \text{ ms}} \frac{1 \mu\text{s}}{10^{-6} \text{ s}} = 300.000 \mu\text{s} \\
 20 \text{ Ms} & \frac{10^6 \text{ s}}{1 \text{ Ms}} \frac{1 \text{ Ks}}{10^3 \text{ s}} = 20.000 \text{ Ks} \\
 6000 \text{ ps} & \frac{10^{-12} \text{ s}}{1 \text{ ps}} \frac{1 \text{ ms}}{10^{-3} \text{ s}} = 6 \cdot 10^{-6} \text{ ms} \\
 500 \text{ kg} & \frac{10^3 \text{ g}}{1 \text{ kg}} \frac{1 \text{ cg}}{10^{-2} \text{ g}} = 5 \cdot 10^7 \text{ cg}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{3} \quad 6 \text{ m}^2 & \frac{1 \text{ dm}^2}{10^{-2} \text{ m}^2} = 600 \text{ dm}^2 \\
 5000 \text{ cm}^3 & \frac{10^{-6} \text{ m}^3}{1 \text{ cm}^3} = 0.005 \text{ m}^3 \\
 800 \text{ m}^2 & \frac{1 \text{ mm}^2}{10^{-6} \text{ m}^2} = 8 \cdot 10^8 \text{ mm}^2
 \end{aligned}$$

$$\begin{aligned}
 40 \text{ dm}^3 & \frac{10^{-3} \text{ m}^3}{1 \text{ dm}^3} \frac{1 \text{ mm}^3}{10^{-9} \text{ m}^3} = 4 \cdot 10^7 \text{ mm}^3 \\
 0.5 \text{ cm}^2 & \frac{10^{-4} \text{ m}^2}{1 \text{ cm}^2} \frac{1 \text{ mm}^2}{10^{-6} \text{ m}^2} = 50 \text{ mm}^2
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{4} \quad V_1 &= 800 \text{ dm}^3 \\
 P_1 &= 2 \cdot 10^5 \text{ Pa} \\
 P_2 &= ? \\
 V_2 &= 500 \text{ dm}^3
 \end{aligned}$$

$$\begin{aligned}
 P_1 \cdot V_1 &= P_2 \cdot V_2 \\
 2 \cdot 10^5 \text{ Pa} \cdot 800 \text{ dm}^3 &= P_2 \cdot 500 \text{ dm}^3 \\
 \frac{2 \cdot 10^5 \cdot 800}{500} \text{ Pa} &= P_2
 \end{aligned}$$

$$\boxed{P_2 = 320.000 \text{ Pa}}$$

$$\begin{aligned}
 \textcircled{5} \quad V_1 &= 6 \text{ m}^3 \\
 P_1 &= 1.8 \cdot 10^5 \text{ Pa} \\
 P_2 &= 2.5 \cdot 10^5 \text{ Pa} \\
 V_2 &= ?
 \end{aligned}$$

$$\begin{aligned}
 P_1 \cdot V_1 &= P_2 \cdot V_2 \\
 1.8 \cdot 10^5 \text{ Pa} \cdot 6 \text{ m}^3 &= 2.5 \cdot 10^5 \text{ Pa} \cdot V_2 \\
 \frac{1.8 \cdot 10^5 \cdot 6}{2.5 \cdot 10^5} \text{ m}^3 &= V_2
 \end{aligned}$$

$$\boxed{V_2 = 4.32 \text{ m}^3}$$

$$\begin{aligned}
 \textcircled{6} \quad 12^\circ\text{C} &= (12 + 273) \text{ K} = 285 \text{ K} \\
 -28^\circ\text{C} &= (-28 + 273) \text{ K} = 245 \text{ K} \\
 400^\circ\text{C} &= (400 + 273) \text{ K} = 673 \text{ K} \\
 -150^\circ\text{C} &= (-150 + 273) \text{ K} = 123 \text{ K} \\
 3000^\circ\text{C} &= (3000 + 273) \text{ K} = 3273 \text{ K}
 \end{aligned}$$

$$\begin{aligned}
 \textcircled{7} \quad 35 \text{ K} &= (35 - 273)^\circ\text{C} = -238^\circ\text{C} \\
 600 \text{ K} &= (600 - 273)^\circ\text{C} = 327^\circ\text{C} \\
 300 \text{ K} &= (300 - 273)^\circ\text{C} = 27^\circ\text{C} \\
 6.000 \text{ K} &= (6000 - 273)^\circ\text{C} = 5727^\circ\text{C} \\
 8 \text{ K} &= (8 - 273)^\circ\text{C} = -265^\circ\text{C}
 \end{aligned}$$

⑧ Indica 3 unitats fonamentals del Sistema Internacional.

⑨ Quines són les propietats dels gasos?

⑩ Quan augmentem la temperatura d'un gas què passa? segons la teoria cinètica-molecular.

$$\begin{aligned} \textcircled{1} \quad 40 \text{ Gm} & \frac{10^9 \text{ m}}{1 \text{ Gm}} = 4 \cdot 10^{10} \text{ m} \\ 600 \text{ nm} & \frac{10^{-9} \text{ m}}{1 \text{ nm}} = 6 \cdot 10^{-7} \text{ m} \\ 3 \mu\text{s} & \frac{10^{-6} \text{ s}}{1 \mu\text{s}} = 3 \cdot 10^{-6} \text{ s} \end{aligned}$$

$$20 \text{ mA} \frac{10^{-3} \text{ A}}{1 \text{ mA}} = 2 \cdot 10^{-2} \text{ A} = 0.02 \text{ A}$$

$$0.6 \text{ h} \frac{3600 \text{ s}}{1 \text{ h}} = 2160 \text{ s}$$

$$\begin{aligned} \textcircled{2} \quad 50000 \text{ dm} & \frac{10^{-1} \text{ m}}{1 \text{ dm}} \frac{1 \text{ km}}{10^3 \text{ m}} = 5 \text{ km} \\ 3 \cdot 10^5 \text{ hs} & \frac{10^2 \text{ s}}{1 \text{ hs}} \frac{1 \text{ Gs}}{10^9 \text{ s}} = 3 \cdot 10^{-2} \text{ Gs} \\ 0.2 \text{ Ks} & \frac{10^3 \text{ s}}{1 \text{ Ks}} \frac{1 \text{ cs}}{10^{-2} \text{ s}} = 20000 \text{ cs} \end{aligned}$$

$$700 \mu\text{s} \frac{10^{-6} \text{ s}}{1 \mu\text{s}} \frac{1 \text{ ms}}{10^{-3} \text{ s}} = 0.7 \text{ ms}$$

$$8000 \text{ hg} \frac{10^2 \text{ g}}{1 \text{ hg}} \frac{1 \text{ cg}}{10^{-2} \text{ g}} = 8 \cdot 10^7 \text{ cg}$$

$$\begin{aligned} \textcircled{3} \quad 300 \text{ m}^2 & \frac{1 \text{ cm}^2}{10^{-4} \text{ m}^2} = 3 \cdot 10^6 \text{ cm}^2 \\ 5 \text{ mm}^3 & \frac{10^{-9} \text{ m}^3}{1 \text{ mm}^3} = 5 \cdot 10^{-9} \text{ m}^3 \\ 3 \cdot 10^4 \text{ m}^2 & \frac{1 \text{ km}^2}{10^6 \text{ m}^2} = 0.03 \text{ km}^2 \end{aligned}$$

$$0.3 \text{ hm}^3 \frac{10^6 \text{ m}^3}{1 \text{ hm}^3} \frac{1 \text{ dm}^3}{10^{-3} \text{ m}^3} = 3 \cdot 10^8 \text{ dm}^3$$

$$400 \text{ cm}^2 \frac{10^{-4} \text{ m}^2}{1 \text{ cm}^2} \frac{1 \text{ hm}^2}{10^4 \text{ m}^2} = 4 \cdot 10^{-6} \text{ hm}^2$$

$$\begin{aligned} \textcircled{4} \quad V_1 &= 300 \text{ dm}^3 \\ P_1 &= 1.6 \cdot 10^5 \text{ Pa} \\ V_2 &= ? \\ P_2 &= 1.2 \cdot 10^5 \text{ Pa} \end{aligned}$$

$$\begin{aligned} P_1 \cdot V_1 &= P_2 \cdot V_2 \\ 1.6 \cdot 10^5 \text{ Pa} \cdot 300 \text{ dm}^3 &= 1.2 \cdot 10^5 \text{ Pa} \cdot V_2 \\ \frac{1.6 \cdot 10^5 \cdot 300}{1.2 \cdot 10^5} \text{ dm}^3 &= V_2 \end{aligned}$$

$$\boxed{V_2 = 400 \text{ dm}^3}$$

$$\begin{aligned} \textcircled{5} \quad V_1 &= 4 \text{ m}^3 \\ P_1 &= 3 \cdot 10^5 \text{ Pa} \\ V_2 &= 8 \text{ m}^3 \\ P_2 &= ? \end{aligned}$$

$$\begin{aligned} P_1 \cdot V_1 &= P_2 \cdot V_2 \\ 3 \cdot 10^5 \text{ Pa} \cdot 4 \text{ m}^3 &= P_2 \cdot 8 \text{ m}^3 \\ \frac{3 \cdot 10^5 \cdot 4}{8} \text{ Pa} &= P_2 \end{aligned}$$

$$\boxed{P_2 = 1.5 \cdot 10^5 \text{ Pa}}$$

$$\begin{aligned} \textcircled{6} \quad 6000^\circ\text{C} &= (6000 + 273) \text{ K} = 6273 \text{ K} \\ -40^\circ\text{C} &= (-40 + 273) \text{ K} = 233 \text{ K} \\ -270^\circ\text{C} &= (-270 + 273) \text{ K} = 3 \text{ K} \\ 450^\circ\text{C} &= (450 + 273) \text{ K} = 723 \text{ K} \\ 22^\circ\text{C} &= (22 + 273) \text{ K} = 295 \text{ K} \end{aligned}$$

$$\begin{aligned} \textcircled{7} \quad 20 \text{ K} &= (20 - 273)^\circ\text{C} = -253^\circ\text{C} \\ 300 \text{ K} &= (300 - 273)^\circ\text{C} = 27^\circ\text{C} \\ 2000 \text{ K} &= (2000 - 273)^\circ\text{C} = 1727^\circ\text{C} \\ 120 \text{ K} &= (120 - 273)^\circ\text{C} = -153^\circ\text{C} \\ 800 \text{ K} &= (800 - 273)^\circ\text{C} = 527^\circ\text{C} \end{aligned}$$

8) Quines són les propietats dels sòlids?

9) Enuncia la llei de Boyle i Mariotte.

10) Què és la pressió d'un gas? segon la teoria cinetomolecular.

$$\textcircled{1} \quad d = 8'96 \frac{\text{g}}{\text{cm}^3}$$

$$m = 200 \text{ g}$$

$$\boxed{V = \frac{m}{d} = \frac{200 \text{ g}}{8'96 \frac{\text{g}}{\text{cm}^3}} = 22'32 \text{ cm}^3}$$

$$\textcircled{2} \quad V_a = ?$$

$$V_g = 600 \text{ cm}^3$$

$$d_g = 0'915 \frac{\text{g}}{\text{cm}^3}$$

$$m_g = V_g \cdot d_g = 600 \text{ cm}^3 \cdot 0'915 \frac{\text{g}}{\text{cm}^3} = 549 \text{ g}$$

$$m_a = m_g = 549 \text{ g}$$

$$\boxed{V_a = \frac{m_a}{d_a} = \frac{549 \text{ g}}{1 \frac{\text{g}}{\text{cm}^3}} = 549 \text{ cm}^3}$$

$$\textcircled{3} \quad Z = 56$$

$$A = 138$$

$$\begin{aligned} \text{protons} &= 56 \\ \text{neutrons} &= 138 - 56 = 82 \\ \text{electrons} &= 56 \end{aligned}$$

$$\textcircled{4} \quad {}_{80}^{202}\text{Hg} \quad \left\{ \begin{array}{l} \text{protons: } 80 \\ \text{neutrons: } 122 \\ \text{electrons: } 80 \end{array} \right.$$

$${}_{28}^{60}\text{Ni} \quad \left\{ \begin{array}{l} \text{protons: } 28 \\ \text{neutrons: } 32 \\ \text{electrons: } 28 \end{array} \right.$$

$$\textcircled{5} \quad \begin{array}{lll} \text{brom-79} & 78'919 \text{ u} & 50'69\% \\ \text{brom-81} & 80'916 \text{ u} & 100 - 50'69 = 49'31\% \end{array}$$

$$\boxed{\text{Ar Br} = \frac{78'919 \cdot 50'69 + 80'916 \cdot 49'31}{100} = 79'90 \text{ u}}$$

$\textcircled{6} \quad \text{Fe}^{3+}$: àtom de ferro que ha perdut 3 electrons.

S^{2-} : àtom de sofre que ha guanyat 2 electrons.

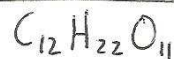


$$\text{Fe: } 56 \cdot 1 = 56$$

$$\text{C: } 12 \cdot 1 = 12$$

$$\text{O: } 16 \cdot 3 = 48$$

$$\boxed{116 \text{ u}}$$



$$\text{C: } 12 \cdot 12 = 144$$

$$\text{H: } 1 \cdot 22 = 22$$

$$\text{O: } 16 \cdot 11 = 176$$

$$\boxed{342 \text{ u}}$$

$\textcircled{8} \quad$ Com s'anomena el pas de l'estat sòlid al líquid? I el pas directe de l'estat sòlid al gasós?

$\textcircled{9} \quad$ Què passa mentre una substància pura es condensa?

$\textcircled{10} \quad$ Què són els isòtops?

① $d = 10^5 \frac{g}{cm^3}$
 $V = 400 cm^3$
 $m = V \cdot d = 400 cm^3 \cdot 10^5 \frac{g}{cm^3} = 4.200 g$

② $V_g = ?$
 $V_a = 500 cm^3$
 $d_g = 0.915 \frac{g}{cm^3}$
 $m_a = V_a \cdot d_a = 500 cm^3 \cdot 1 \frac{g}{cm^3} = 500 g$
 $m_g = m_a = 500 g$
 $V_g = \frac{m_g}{d_g} = \frac{500 g}{0.915 \frac{g}{cm^3}} = 546.4 cm^3$

③ $Z = 52$
 $A = 125$
 protons: 52
 neutrons: $125 - 52 = 73$
 electrons: 52

④ $^{80}_{34}Se$ } protons: 34
 } neutrons: 46
 } electrons: 34
 $^{59}_{27}Co$ } protons: 27
 } neutrons: 32
 } electrons: 27

⑤ rubidi - 85 $84.912 u$ 72.17%
 rubidi - 87 $86.909 u$ $100 - 72.17 = 27.83\%$
 $Ar Rb = \frac{84.912 \cdot 72.17 + 86.909 \cdot 27.83}{100} = 85.47 u$

⑥ Na^+ : àtom de sodi que ha perdut 1 electró
 P^{3-} : àtom de fòsfor que ha guanyat 3 electrons

⑦ Na_2SO_4 $C_6H_{12}O_6$
 $Na: 23 \cdot 2 = 46$ $C: 12 \cdot 6 = 72$
 $S: 32 \cdot 1 = 32$ $H: 1 \cdot 12 = 12$
 $O: 16 \cdot 4 = 64$ $O: 16 \cdot 6 = 96$
 $142 u$ $180 u$

- ⑧ Com s'anomena el pas de l'estat gasós al líquid? I el pas de l'estat líquid al sòlid?
- ⑨ Què passa mentre una substància pura es solidifica?
- ⑩ Què és un àtom?

$$(1) \quad 80 \text{ g Ag} \cdot \frac{1 \text{ mol Ag}}{108 \text{ g Ag}} \cdot \frac{6.022 \cdot 10^{23} \text{ àtoms Ag}}{1 \text{ mol Ag}} = \boxed{4.461 \cdot 10^{23} \text{ àtoms Ag}}$$

$$(2) \quad 10^{25} \text{ molècules Pb(OH)}_4 \cdot \frac{1 \text{ mol Pb(OH)}_4}{6.022 \cdot 10^{23} \text{ molècules Pb(OH)}_4} \cdot \frac{275 \text{ g Pb(OH)}_4}{1 \text{ mol Pb(OH)}_4} = \boxed{4.567 \text{ g Pb(OH)}_4}$$

$$207 + 16 \cdot 4 + 1 \cdot 4 = 275$$

$$(3) \quad 20 \text{ L O}_2 \cdot \frac{1 \text{ mol O}_2}{22.7 \text{ L O}_2} \cdot \frac{32 \text{ g O}_2}{1 \text{ mol O}_2} = \boxed{28.19 \text{ g O}_2}$$

	IUPAC	stock
(4) Ni_2O_3	Triòxid de níquel	Òxid de níquel (III)
Na_2O	Òxid de sodi	Òxid de sodi
Br_2O_5	Pentaòxid de dibrom	Òxid de brom (V)
Cu_2O	Òxid de coure	Òxid de coure (I)
SnO_2	Diòxid d'estany	Òxid d'estany (IV)

	IUPAC	stock
(5) Fe(OH)_3	Trihidròxid de ferro	Hidròxid de ferro (III)
Ca(OH)_2	Dihidròxid de calci	Hidròxid de calci
Sn(OH)_4	Tetrahidròxid d'estany	Hidròxid d'estany (IV)
KH	Hidrur de potassi	Hidrur de potassi
PbCl_4	Tetràclorur de plom	Clorur de plom (IV)

(6) Òxid de calci	CaO	Hidròxid de potassi	KOH
Òxid de mercuri (I)	Hg_2O	Trihidròxid de níquel	Ni(OH)_3
Òxid d'alumini	Al_2O_3	Dihidròxid de magnesi	Mg(OH)_2
Heptaòxid de diclor	Cl_2O_7	Hidrur de ferro (II)	FeH_2
Diòxid de carboni	CO_2	Iodur d'or (III)	AuI_3

(7) Què és un mol?

(8) Què vol dir que un gas es troba en condicions normals? Què li passa a un gas que es troba en condicions normals?

(9) Què és un hidròxid?

(10) Què és un àcid? posa quatre exemples d'àcids, amb la fórmula i el nom.

$$(1) \quad 10^{22} \text{ àtoms Cr} \cdot \frac{1 \text{ mol Cr}}{6.022 \cdot 10^{23} \text{ àtoms Cr}} \cdot \frac{52 \text{ g Cr}}{1 \text{ mol Cr}} = \boxed{0.8635 \text{ g Cr}}$$

$$(2) \quad 400 \text{ g Fe(OH)}_3 \cdot \frac{1 \text{ mol Fe(OH)}_3}{107 \text{ g Fe(OH)}_3} \cdot \frac{6.022 \cdot 10^{23} \text{ molècules Fe(OH)}_3}{1 \text{ mol Fe(OH)}_3} = 2.251 \cdot 10^{24} \text{ molècules Fe(OH)}_3$$

$56 \cdot 1 = 56$
 $16 \cdot 3 = 48$
 $1 \cdot 3 = 3$
 107

$$(3) \quad 60 \text{ g N}_2 \cdot \frac{1 \text{ mol N}_2}{28 \text{ g N}_2} \cdot \frac{22.4 \text{ L N}_2}{1 \text{ mol N}_2} = \boxed{48 \text{ L N}_2}$$

	Estoquiometria	Stock
(4) Al_2O_3	Triòxid de dialumini	Òxid d'alumini
HgO	Òxid de mercuri	Òxid de mercuri (II)
Cu_2O	Òxid de coure	Òxid de coure (I)
Li_2O	Òxid de liti	Òxid de liti
CoO	Òxid de cobalt	Òxid de cobalt (II)

(5) HgOH	Hidroxid de mercuri	Hidroxid de mercuri (I)
Co(OH)_2	Dihidroxid de cobalt	Hidroxid de cobalt (II)
Fe(OH)_3	Trihidroxid de ferro	Hidroxid de ferro (III)
PbH_4	Tetrahidru de plom	Hidru de plom (IV)
AlBr_3	Tribromur d'alumini	Bromur d'alumini

(6) Òxid de rubidi	Rb_2O	Hidroxid de magnesi	Mg(OH)_2
Òxid de mercuri (II)	HgO	Trihidroxid de níquel	Ni(OH)_3
Òxid de cobalt (III)	Co_2O_3	Tetrahidroxid de plom	Pb(OH)_4
Pentaòxid de didor	Cl_2O_5	Hidru d'alumini	AlH_3
Triòxid de sofre	SO_3	Clorur de ferro (III)	FeCl_3

(7) Què és el nombre d'Avogadro? En què s'utilitza?

(8) Què és la pressió estàndard? Què li passa a un gas que es troba a la pressió estàndard i a 0°C ?

(9) Què és un òxid?

(10) Què és un àcid? posa quatre exemples d'oxoàcids, amb la fórmula i el nom.

$$\textcircled{1} \quad 100 \text{ g solució} \cdot \frac{20 \text{ g sucre}}{400 \text{ g solució}} = 5 \text{ g sucre}$$

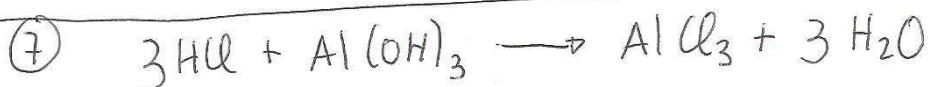
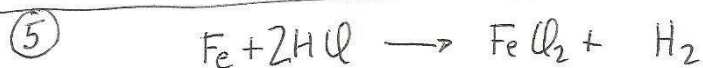
$$\boxed{\text{Concentració} = 5\%}$$

$$\textcircled{2} \quad 400 \text{ cm}^3 \text{ solució} \cdot \frac{1 \text{ dm}^3 \text{ solució}}{1000 \text{ cm}^3 \text{ solució}} \cdot \frac{6 \text{ g NaCl}}{1 \text{ dm}^3 \text{ solució}} = \boxed{2.4 \text{ g NaCl}}$$

$$\textcircled{3} \quad 1 \text{ L solució} \cdot \frac{1000 \text{ cm}^3 \text{ solució}}{1 \text{ L solució}} \cdot \frac{6 \text{ g KNO}_3}{800 \text{ cm}^3 \text{ solució}} \cdot \frac{1 \text{ mol KNO}_3}{101 \text{ g KNO}_3} = 0.07426 \text{ mol KNO}_3$$

$$39 + 14 + 16 \cdot 3 = 101$$

$$\boxed{\text{Concentració} = 0.07426 \frac{\text{mols}}{\text{L}}}$$



$\textcircled{8}$ Què és el tant per cent en massa d'una dissolució?

$\textcircled{9}$ Què és una reacció química?

$\textcircled{10}$ Què són els productes en una reacció química?

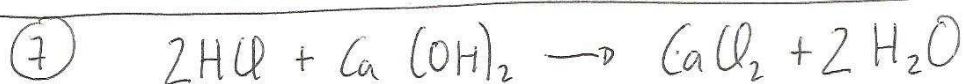
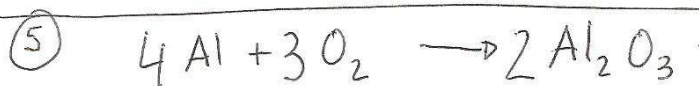
$$\textcircled{1} \quad 500 \text{ g solució} \cdot \frac{3 \text{ g sucre}}{100 \text{ g solució}} = \boxed{15 \text{ g sucre}}$$

$$\textcircled{2} \quad 1 \text{ dm}^3 \text{ solució} \cdot \frac{1000 \text{ cm}^3 \text{ solució}}{1 \text{ dm}^3 \text{ solució}} \cdot \frac{10 \text{ g NaCl}}{600 \text{ cm}^3 \text{ solució}} = 16,67 \text{ g NaCl}$$

$$\boxed{\text{Concentració} = 16,67 \frac{\text{g}}{\text{dm}^3}}$$

$$\textcircled{3} \quad 400 \text{ cm}^3 \text{ solució} \cdot \frac{1 \text{ dm}^3 \text{ solució}}{1000 \text{ cm}^3 \text{ solució}} \cdot \frac{0,2 \text{ mols KNO}_3}{1 \text{ dm}^3 \text{ solució}} \cdot \frac{101 \text{ g KNO}_3}{1 \text{ mol KNO}_3} = \boxed{8,08 \text{ g KNO}_3}$$

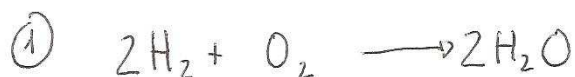
$$39 + 14 + 16 \cdot 3 = 101$$



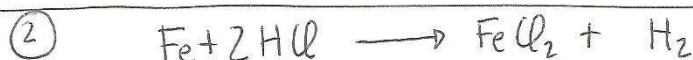
$\textcircled{8}$ Què és la concentració en massa d'una dissolució?

$\textcircled{9}$ Què és la molaritat d'una dissolució?

$\textcircled{10}$ Què són els reactius en una reacció química?



$$50\text{ g H}_2\text{O} \frac{1\text{ mol H}_2\text{O}}{18\text{ g H}_2\text{O}} \frac{2\text{ mol H}_2}{2\text{ mol H}_2\text{O}} \frac{2\text{ g H}_2}{1\text{ mol H}_2} = \boxed{5'556\text{ g H}_2}$$



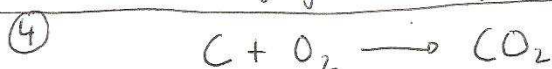
$$100\text{ g FeCl}_2 \frac{1\text{ mol FeCl}_2}{127\text{ g FeCl}_2} \frac{1\text{ mol Fe}}{1\text{ mol FeCl}_2} \frac{56\text{ g Fe}}{1\text{ mol Fe}} = \boxed{44'09\text{ g Fe}}$$

$$\begin{aligned} 56 \cdot 1 &= 56 \\ 35 \cdot 2 &= 71 \\ \hline 127 \end{aligned}$$



$$60\text{ g HgO} \frac{1\text{ mol HgO}}{217\text{ g HgO}} \frac{1\text{ mol O}_2}{2\text{ mol HgO}} \frac{22'4\text{ L O}_2}{1\text{ mol O}_2} = \boxed{3'097\text{ L O}_2}$$

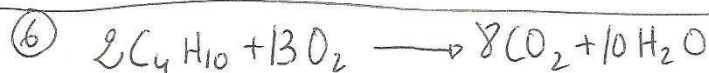
$$\begin{aligned} 201 \\ 16 \\ \hline 217 \end{aligned}$$



$$5\text{ Kg carbó} \frac{1000\text{ g carbó}}{1\text{ Kg carbó}} \frac{90\text{ g C}}{100\text{ g carbó}} \frac{1\text{ mol C}}{12\text{ g C}} \frac{1\text{ mol CO}_2}{1\text{ mol C}} \frac{22'7\text{ L CO}_2}{1\text{ mol CO}_2} = \boxed{8513\text{ L CO}_2}$$



$$40\text{ L C}_5\text{H}_{12} \frac{1\text{ mol C}_5\text{H}_{12}}{22'4\text{ L C}_5\text{H}_{12}} \frac{6\text{ mol H}_2\text{O}}{1\text{ mol C}_5\text{H}_{12}} \frac{18\text{ g H}_2\text{O}}{1\text{ mol H}_2\text{O}} = \boxed{192'9\text{ g H}_2\text{O}}$$



$$4\text{ Kg C}_4\text{H}_{10} \frac{1000\text{ g C}_4\text{H}_{10}}{1\text{ Kg C}_4\text{H}_{10}} \frac{1\text{ mol C}_4\text{H}_{10}}{58\text{ g C}_4\text{H}_{10}} \frac{13\text{ mol O}_2}{2\text{ mol C}_4\text{H}_{10}} \frac{6'022 \cdot 10^{23}\text{ molecules O}_2}{1\text{ mol O}_2} = \boxed{2'700 \cdot 10^{26}\text{ molecules O}_2}$$

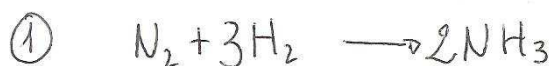
$$\begin{aligned} 12 \cdot 4 &= 48 \\ 1 \cdot 10 &= 10 \\ \hline 58 \end{aligned}$$

7 Com es va formar el petroli?

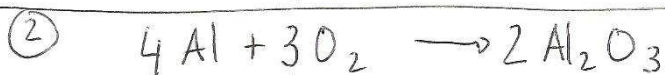
8 Què és la pluja àcida?

9 Quins problemes presenta l'energia nuclear?

10 Com es pot aprofitar l'energia solar?



$$50 \text{ g N}_2 \frac{1 \text{ mol N}_2}{28 \text{ g N}_2} \frac{3 \text{ mol H}_2}{1 \text{ mol N}_2} \frac{2 \text{ g H}_2}{1 \text{ mol H}_2} = \boxed{10,71 \text{ g H}_2}$$



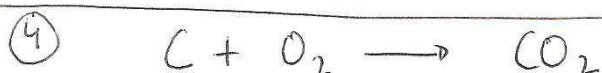
$$15 \text{ g Al} \frac{1 \text{ mol Al}}{27 \text{ g Al}} \frac{2 \text{ mol Al}_2\text{O}_3}{4 \text{ mol Al}} \frac{102 \text{ g Al}_2\text{O}_3}{1 \text{ mol Al}_2\text{O}_3} = \boxed{28,33 \text{ g Al}_2\text{O}_3}$$

$$\begin{array}{l} 27 \cdot 2 = 54 \\ 16 \cdot 3 = 48 \\ \hline 102 \end{array}$$



$$25 \text{ g KClO}_3 \frac{1 \text{ mol KClO}_3}{122,5 \text{ g KClO}_3} \frac{3 \text{ mol O}_2}{2 \text{ mol KClO}_3} \frac{22,4 \text{ L O}_2}{1 \text{ mol O}_2} = \boxed{6,857 \text{ L O}_2}$$

$$\begin{array}{l} 39 \cdot 1 = 39 \\ 35,5 \cdot 1 = 35,5 \\ 16 \cdot 3 = 48 \\ \hline 122,5 \end{array}$$



$$\begin{array}{r} 12 \\ 32 \\ \hline 44 \end{array}$$

$$12 \text{ kg carbó} \frac{1000 \text{ g carbó}}{1 \text{ kg carbó}} \frac{85 \text{ g C}}{100 \text{ g carbó}} \frac{1 \text{ mol C}}{12 \text{ g C}} \frac{1 \text{ mol CO}_2}{1 \text{ mol C}} \frac{44 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{37400 \text{ g CO}_2}$$



$$60 \text{ L C}_3\text{H}_8 \frac{1 \text{ mol C}_3\text{H}_8}{22,4 \text{ L C}_3\text{H}_8} \frac{4 \text{ mol H}_2\text{O}}{1 \text{ mol C}_3\text{H}_8} \frac{6,022 \cdot 10^{23} \text{ moléculas H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = \boxed{6,452 \cdot 10^{24} \text{ moléculas H}_2\text{O}}$$



$$\begin{array}{l} 12 \cdot 2 = 24 \\ 16 \cdot 7 = 112 \\ \hline 136 \end{array}$$

$$3 \text{ kg C}_2\text{H}_6 \frac{1000 \text{ g C}_2\text{H}_6}{1 \text{ kg C}_2\text{H}_6} \frac{1 \text{ mol C}_2\text{H}_6}{30 \text{ g C}_2\text{H}_6} \frac{4 \text{ mol CO}_2}{2 \text{ mol C}_2\text{H}_6} \frac{22,4 \text{ L CO}_2}{1 \text{ mol CO}_2} = \boxed{4480 \text{ L CO}_2}$$

7) Com es va formar el carbó?

8) Què és l'efecte hivernacle?

9) Què és l'energia hidràulica?

10) Què és l'energia geotèrmica?

$$\textcircled{1} \quad \boxed{F = K \frac{Q_1 \cdot Q_2}{r^2} = 9 \cdot 10^9 \frac{5 \cdot 10^{-9} \cdot 3 \cdot 10^{-9}}{0.25^2} = 2.16 \cdot 10^{-6} \text{ N}}$$

$$\textcircled{2} \quad Q = 5 \mu\text{C} = 5 \cdot 10^{-6} \text{ C}$$

$$E = 600 \frac{\text{N}}{\text{C}}$$

$$\boxed{F = Q \cdot E = 5 \cdot 10^{-6} \cdot 600 = 0.003 \text{ N}}$$

$$\textcircled{3} \quad \Delta V = 40 \text{ V}$$

$$I = 300 \text{ mA} \frac{1 \text{ A}}{1000 \text{ mA}} = 0.3 \text{ A}$$

$$\Delta t = 3 \text{ h} \frac{3600 \text{ s}}{1 \text{ h}} = 10.800 \text{ s}$$

$$Q = I \cdot \Delta t = 0.3 \cdot 10.800 = 3240 \text{ C}$$

$$\boxed{W = Q \cdot \Delta V = 3240 \cdot 40 = 129.600 \text{ J}}$$

$$\textcircled{4} \quad \Delta V = 200 \text{ V}$$

$$R = 40 \Omega$$

$$Q = ?$$

$$\Delta t = 30 \text{ min} \frac{60 \text{ s}}{1 \text{ min}} = 1800 \text{ s}$$

$$I = \frac{\Delta V}{R} = \frac{200}{40} = 5 \text{ A}$$

$$\boxed{Q = I \cdot \Delta t = 5 \cdot 1800 = 9.000 \text{ C}}$$

$$\textcircled{5} \quad \Delta V = 25 \text{ V}$$

$$I = 2 \text{ A}$$

$$W = ?$$

$$\Delta t = 4 \text{ h} \frac{3600 \text{ s}}{1 \text{ h}} = 14.400 \text{ s}$$

$$R = \frac{\Delta V}{I} = \frac{25}{2} = 12.5 \Omega$$

$$\boxed{W = I^2 \cdot R \cdot \Delta t = 2^2 \cdot 12.5 \cdot 14.400 = 720.000 \text{ J}}$$

$$\textcircled{6} \quad P = 1.500 \text{ W} = 1.5 \text{ kW}$$

$$\Delta t = 24 \text{ h}$$

$$1 \text{ kWh} = 0.13 \text{ €}$$

$$\text{Cost} = ?$$

$$W = P \cdot \Delta t = 1.5 \text{ kW} \cdot 24 \text{ h} = 36 \text{ kWh} \frac{0.13 \text{ €}}{1 \text{ kWh}} = 4.68 \text{ €}$$

$\textcircled{7}$ Què diu la llei de Coulomb?

$\textcircled{8}$ Què és la diferència de potencial entre dos punts d'un camp elèctric?

$\textcircled{9}$ Què és la intensitat del corrent elèctric?

$\textcircled{10}$ Què diu la llei de Joule?

① $Q_1 = 4 \mu C = 4 \cdot 10^{-6} C$
 $Q_2 = 5 \mu C = 5 \cdot 10^{-6} C$
 $r = 60 \text{ cm} \frac{1 \text{ m}}{100 \text{ cm}} = 0.6 \text{ m}$

$$F = k \frac{Q_1 \cdot Q_2}{r^2} = 9 \cdot 10^9 \frac{4 \cdot 10^{-6} \cdot 5 \cdot 10^{-6}}{0.6^2} = 0.5 \text{ N}$$

② $Q = 8 \text{ nC} = 8 \cdot 10^{-9} C$
 $F = 6 \cdot 10^{-5} \text{ N}$
 $E = ?$

$$E = \frac{F}{Q} = \frac{6 \cdot 10^{-5}}{8 \cdot 10^{-9}} = 7.500 \frac{\text{N}}{\text{C}}$$

③ $\Delta V = 60 \text{ V}$
 $I = 400 \text{ mA} \frac{1 \text{ A}}{1000 \text{ mA}} = 0.4 \text{ A}$
 $\Delta t = 2 \text{ h} \frac{3600 \text{ s}}{1 \text{ h}} = 7200 \text{ s}$
 $W = ?$

$$Q = I \cdot \Delta t = 0.4 \cdot 7200 = 2.880 \text{ C}$$

$$W = Q \cdot \Delta V = 2.880 \cdot 60 = 172.800 \text{ J}$$

④ $R = 50 \Omega$
 $Q = 5.000 \text{ C}$
 $\Delta t = 20 \text{ min} \frac{60 \text{ s}}{1 \text{ min}} = 1200 \text{ s}$
 $\Delta V = ?$

$$I = \frac{Q}{\Delta t} = \frac{5.000}{1200} = 4.167 \text{ A}$$

$$\Delta V = I \cdot R = 4.167 \cdot 50 = 208.4 \text{ V}$$

⑤ $\Delta V = 30 \text{ V}$
 $R = 15 \Omega$
 $W = ?$
 $\Delta t = 4 \text{ h} \frac{3600 \text{ s}}{1 \text{ h}} = 14.400 \text{ s}$

$$I = \frac{\Delta V}{R} = \frac{30}{15} = 2 \text{ A}$$

$$W = I^2 \cdot R \cdot \Delta t = 2^2 \cdot 15 \cdot 14.400 = 864.000 \text{ J}$$

⑥ $P = 60 \text{ W} \frac{1 \text{ kW}}{1000 \text{ W}} = 0.06 \text{ kW}$
 $\Delta t = 3 \text{ dies} \frac{24 \text{ h}}{1 \text{ dia}} = 72 \text{ h}$
 $1 \text{ kWh} = 0.13 \text{ €}$
 $\text{cost} = ?$

$$W = P \cdot \Delta t = 0.06 \text{ kW} \cdot 72 \text{ h} = 4.32 \text{ kWh} \frac{0.13 \text{ €}}{1 \text{ kWh}} = 0.5616 \text{ €}$$

⑦ Què és la intensitat del camp elèctric en un punt?

⑧ Què és la resistència d'un conductor?

⑨ Què és un generador elèctric?

⑩ Què diu la llei d'Ohm?

$$\begin{aligned} \textcircled{1} \quad 600 \text{ mm} \cdot \frac{1 \text{ cm}}{10 \text{ mm}} &= 60 \text{ cm} \\ 2000 \text{ m} \cdot \frac{1 \text{ km}}{100 \text{ m}} &= 20 \text{ km} \\ 25 \text{ Ms} \cdot \frac{10^6 \text{ s}}{1 \text{ Ms}} \cdot \frac{1 \text{ hs}}{100 \text{ s}} &= 250.000 \text{ hs} \end{aligned}$$

$$800 \text{ dam}^2 \cdot \frac{10^2 \text{ m}^2}{1 \text{ dam}^2} = 80.000 \text{ m}^2$$

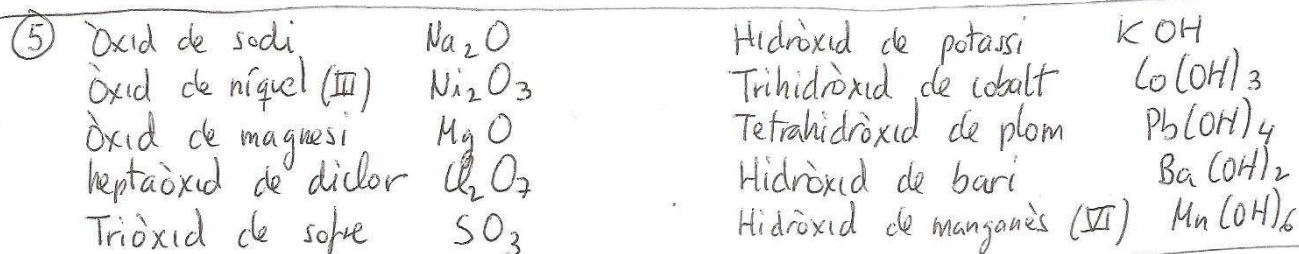
$$2 \text{ m}^3 \cdot \frac{1 \text{ mm}^3}{10^{-9} \text{ m}^3} = 2 \cdot 10^9 \text{ mm}^3$$

$$\begin{aligned} \textcircled{2} \quad \text{protons} &= 30 \\ \text{neutrons} &= 65 - 30 = 35 \\ \text{electrons} &= 30 \end{aligned}$$

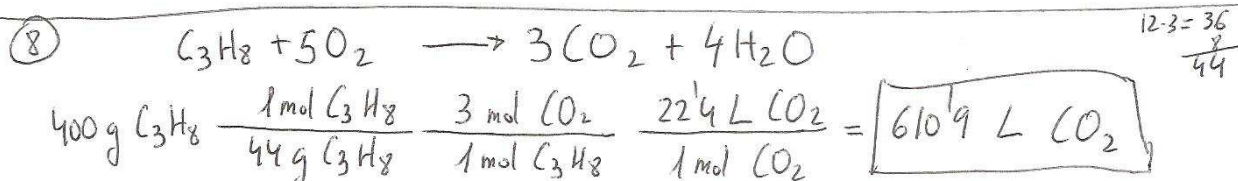
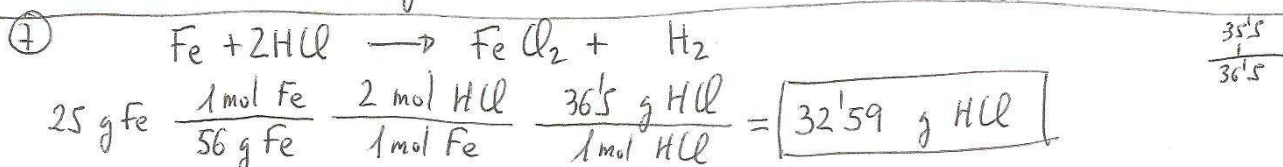
$$\textcircled{3} \quad 100 - 72'17 = 27'83$$

$$\boxed{\text{Ar Rb} = \frac{84'912 \cdot 72'17 + 86'909 \cdot 27'83}{100} = 85'47 \text{ u}}$$

$$\textcircled{4} \quad 3 \cdot 10^{24} \text{ atoms Fe} \cdot \frac{1 \text{ mol Fe}}{6'022 \cdot 10^{23} \text{ atoms Fe}} \cdot \frac{56 \text{ g Fe}}{1 \text{ mol Fe}} = \boxed{279'0 \text{ g Fe}}$$



$$\textcircled{6} \quad 100 \text{ g solució} \cdot \frac{10 \text{ g sucre}}{550 \text{ g solució}} = 1'818 \text{ g sucre} \quad \boxed{\text{Concentració} = 1'818 \%}$$



$$\textcircled{9} \quad \begin{aligned} R &= 40 \text{ } \Omega \\ Q &= 8.000 \text{ C} \\ At &= 10 \text{ min} \cdot \frac{60 \text{ s}}{1 \text{ min}} = 600 \text{ s} \end{aligned}$$

$$I = \frac{Q}{At} = \frac{8.000}{600} = 13'33 \text{ A}$$

$$\boxed{\Delta V = I \cdot R = 13'33 \cdot 40 = 533'2 \text{ V}}$$

$\textcircled{10}$ Què és el nombre atòmic d'un element?

$$① \quad 6000 \text{ cm} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ Km}}{1000 \text{ m}} = 0.06 \text{ Km}$$

$$400 \text{ cm} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{1 \text{ dam}}{10 \text{ m}} = 0.4 \text{ dam}$$

$$20 \text{ Gs} \cdot \frac{10^9 \text{ s}}{1 \text{ Gs}} \cdot \frac{1 \text{ Ks}}{10^3 \text{ s}} = 2 \cdot 10^7 \text{ Ks}$$

$$50 \text{ hm}^2 \cdot \frac{10^4 \text{ m}^2}{1 \text{ hm}^2} = 5 \cdot 10^5 \text{ m}^2$$

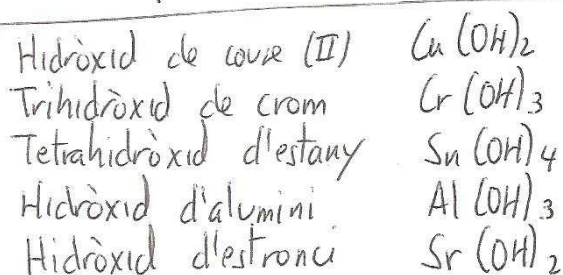
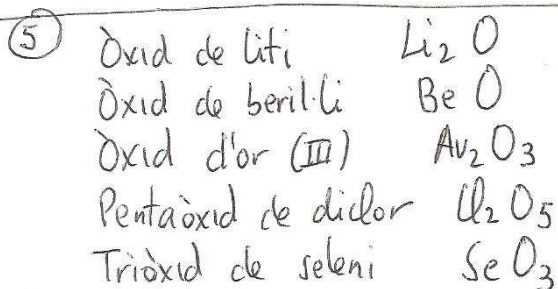
$$6000 \text{ cm}^3 \cdot \frac{1 \text{ m}^3}{10^6 \text{ cm}^3} = 0.006 \text{ m}^3$$

$$② \quad \begin{aligned} \text{protons} &= 56 \\ \text{neutrons} &= 137 - 56 = 81 \\ \text{electrons} &= 56 \end{aligned}$$

$$③ \quad 100 - 50.69 = 49.31$$

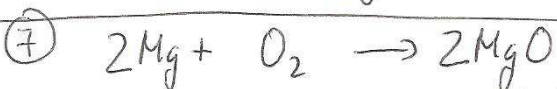
$$\overline{\text{Ar Br}} = \frac{78.919 \cdot 50.69 + 80.916 \cdot 49.31}{100} = 79.90 \text{ u}$$

$$④ \quad 65 \text{ g Cr} \cdot \frac{1 \text{ mol Cr}}{52 \text{ g Cr}} \cdot \frac{6.022 \cdot 10^{23} \text{ atoms Cr}}{1 \text{ mol Cr}} = 7.528 \cdot 10^{23} \text{ atoms Cr}$$



$$⑥ \quad 100 \text{ g solució} \cdot \frac{20 \text{ g sucre}}{500 \text{ g solució}} = 4 \text{ g sucre}$$

$$\text{Concentració} = 4\%$$



$$50 \text{ g Mg} \cdot \frac{1 \text{ mol Mg}}{24.3 \text{ g Mg}} \cdot \frac{1 \text{ mol O}_2}{2 \text{ mol Mg}} \cdot \frac{22.4 \text{ L O}_2}{1 \text{ mol O}_2} = 23.05 \text{ L O}_2$$



$$\begin{aligned} 12 \cdot 3 &= 36 \\ 1 \cdot 8 &= 8 \\ &= 44 \end{aligned}$$

$$400 \text{ g C}_3\text{H}_8 \cdot \frac{1 \text{ mol C}_3\text{H}_8}{44 \text{ g C}_3\text{H}_8} \cdot \frac{4 \text{ mol H}_2\text{O}}{1 \text{ mol C}_3\text{H}_8} \cdot \frac{18 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 654.5 \text{ g H}_2\text{O}$$

$$⑨ \quad \Delta V = 50 \text{ V}$$

$$I = 1500 \text{ mA} = 1.5 \text{ A}$$

$$W = ?$$

$$\Delta t = 3 \text{ h} \cdot \frac{3600 \text{ s}}{1 \text{ h}} = 10.800 \text{ s}$$

$$R = \frac{\Delta V}{I} = \frac{50}{1.5} = 33.33 \text{ } \Omega$$

$$W = I^2 \cdot R \cdot \Delta t$$

$$W = 1.5^2 \cdot 33.33 \cdot 10800 = 809.900 \text{ J}$$

⑩ Què són els isòtops?

$$\begin{aligned} \textcircled{1} \quad 40 \text{ dam} & \frac{10 \text{ m}}{1 \text{ dam}} \frac{100 \text{ cm}}{1 \text{ m}} = 40.000 \text{ cm} \\ 5000 \text{ dm} & \frac{1 \text{ m}}{10 \text{ dm}} \frac{1 \text{ hm}}{100 \text{ m}} = 5 \text{ hm} \\ 200 \text{ Ms} & \frac{10^6 \text{ s}}{1 \text{ Ms}} \frac{1 \text{ ks}}{10^3 \text{ s}} = 200.000 \text{ ks} \end{aligned}$$

$$3 \text{ Km}^2 \frac{10^6 \text{ m}^2}{1 \text{ Km}^2} = 3 \cdot 10^6 \text{ m}^2$$

$$700 \text{ dm}^3 \frac{1 \text{ m}^3}{10^3 \text{ dm}^3} = 0,7 \text{ m}^3$$

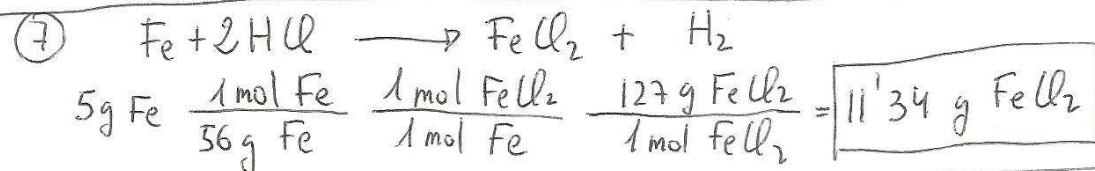
$$\textcircled{2} \quad z = 50 \quad A = 50 + 69 = 119$$

$$\textcircled{3} \quad \overline{\text{Ar Rb}} = \frac{84'912 \cdot 72'17 + 86'909 \cdot 27'83}{100} = \boxed{85'47 \text{ u}}$$

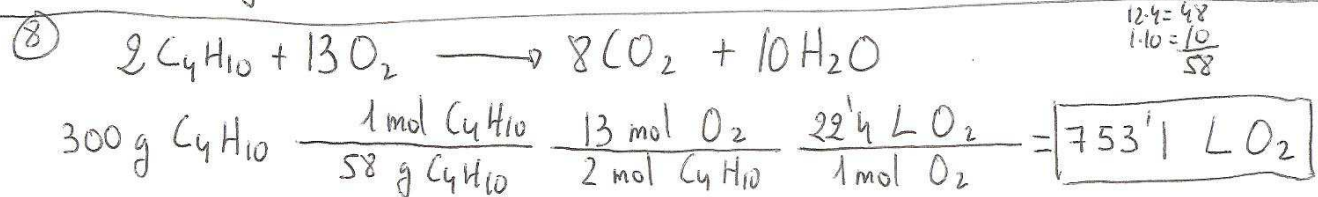
$$\textcircled{4} \quad 3 \cdot 10^{22} \text{ atoms Cr} \frac{1 \text{ mol Cr}}{6,022 \cdot 10^{23} \text{ atoms Cr}} \frac{52 \text{ g Cr}}{1 \text{ mol Cr}} = \boxed{2'591 \text{ g Cr}}$$

òxid de sodi	Na_2O	Hidròxid de mercuri (II)	$\text{Hg}(\text{OH})_2$
òxid de ferro (II)	FeO	Trihidròxid de níquel	$\text{Ni}(\text{OH})_3$
òxid d'alumini	Al_2O_3	Tetrahidròxid de plom	$\text{Pb}(\text{OH})_4$
Heptaòxid de didor	Cl_2O_7	Hidròxid d'estany (IV)	$\text{Sn}(\text{OH})_4$
Triòxid de sofre	SO_3	Hidròxid de magnesi	$\text{Mg}(\text{OH})_2$

$$\textcircled{6} \quad 4\% \quad 600 \text{ g dissolució} \frac{4 \text{ g sucre}}{100 \text{ g dissolució}} = \boxed{24 \text{ g sucre}}$$



$$\frac{56}{127}$$



$$\frac{12 \cdot 4 = 48}{1 \cdot 10 = 10} \frac{58}{58}$$

$\textcircled{9}$ Què és un ió?

$\textcircled{10}$ Què és una reacció química?