



General Certificate of Secondary Education
2011

Science: Chemistry

Paper 2
Foundation Tier

[G1402]

TUESDAY 7 JUNE, AFTERNOON

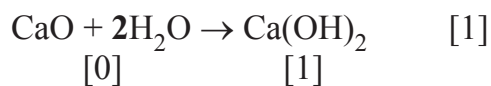
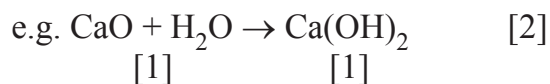
**MARK
SCHEME**

Guidelines for marking equations

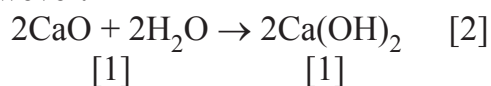
Equations where the stoichiometry is 1 gain [2] maximum

[1] for correct formula of reactant/s

[1] for correct formula of product/s



However:

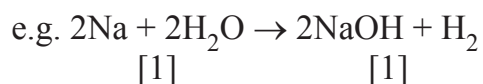


Equations where the stoichiometry is more than 1 gain [3]

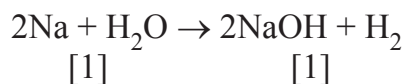
[1] for correct formula of reactant/s

[1] for correct formula of product/s

[1] for correct balancing



+ [1] for balancing = [3]



No balancing mark = [2]

1 (a) (i) two atoms. [1]

(ii) hydrogen/oxygen/any halogen. [1]

(iii) oxygen/any noble gas. [1]

(iv)

Name	nitrogen
State at room temperature and pressure	gas [1]
Colour	colourless [1]
Odour	odourless/no odour [1]

[3]

(v) unreactive/inert [1]

(b)

Name	Ammonia
State at room temperature and pressure	gas [1]
Colour	colourless [1]
Odour	pungent/smelly [1]
pH of aqueous ammonia	9–11 [1]

[4]

(c) (i) white [1] smoke/fumes/solid/cloud [1] [2]

(ii) corrosive [1]

(iii) gloves/lab coat/fume cupboard/apron [1]

(d) nitrogen = method 1 [1]
ammonia = method 3 [1]
hydrogen chloride = method 2 [1] [3]

AVAILABLE
MARKS

18

- 2 (a) (i) solid dissolved/solute [1]
in a liquid/solvent [1] [2]
- (ii) a few well spaced particles [1]
- (iii) decreases [1]
- (iv) increases [1]
- (b) (i) flammable [1]
- (ii) explosion risk [1]

(c) (i)

Element	Melting point (°C)	Boiling point (°C)	State at room temperature (20°C)
silicon	1410	2355	solid [1]
oxygen	-219	-183	gas [1]
sodium	98	890	solid [1]
bromine	-7	59	liquid [1]

[4]

- (ii) substance which cannot be broken down into anything simpler [1]
by chemical means [1]
(substance made up of only one type of atom [2]) [2]

AVAILABLE
MARKS

(d) (i) B [1]

(ii) 660 [1] °C [1]

(iii) liquid [1] to gas [1]
solid [1] to gas [1]
gas [1] to liquid [1] [6]

3 (a) (i) A = anode [1]
B = cathode [1]
C = evaporating basin/crucible [1]
D = gauze/pipeclay triangle [1]
E = tripod [1] [5]

(ii) bulb/ammeter [1]

(iii) decomposition [1]
using (a direct current of) electricity [1] [2]

(iv) ions [1]

(v)

Electrode	Observations	Name of Product
A	red-brown [1] pungent [1] gas [1] max [2]	bromine [1]
B	silvery grey bead	lead [1]

[4]

(vi) bromine/lead fumes are toxic [1]

AVAILABLE
MARKS

21

			AVAILABLE MARKS
(b) (i) F	impure copper [1]		18
G	pure copper [1]	[2]	
(ii)	copper sulphate/copper chloride/copper nitrate	[1]	
(iii)	ductile	[1]	
4 (a) (i)	add universal indicator/pH paper [1] compare to colour chart [1] or use pH meter [1] read off value [1]	[2]	
(ii)	weak acid lemon juice [1] strong alkali sodium hydroxide [1] neutral water [1]	[3]	
(iii)	H ⁺	[1]	
(iv)	hydroxide	[1]	
(v)	sodium sulphate	[1]	
(vi)	$2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$	[3]	
(b) (i)	lead nitrate [1] any soluble iodide, e.g. sodium iodide, potassium iodide etc. [1]	[2]	
(ii)	marks are awarded for labelled and <i>recognisable</i> pieces of <i>assembled</i> apparatus labels: filter funnel [1] filter paper [1] conical flask/suitable container [1]	[3]	
(iii)	low temperature oven/desiccator	[1]	
(iv)	lead(II) ion Pb ²⁺ [1] iodide ion I ⁻ [1]	[2]	
(v)	PbCl ₂ /PbSO ₄ /PbO/PbBr ₂	[1]	
			20

5 (a) (i)

Reactants	Name	Nitrogen [1]	Sulphur	Carbon [1]
	Formula	N ₂	S	C

Combustion

Products	Name	Nitrogen dioxide	Sulphur dioxide [1]	Carbon dioxide
	Formula	NO ₂ [1]	SO ₂	CO ₂ [1]

[5]

(ii) fuels and oxygen [1]
 reacting [1]
 releasing heat [1]
 forming oxides [1] max [3]

(iii) carbon [1]

(iv) water [1]

(v) dead plants/animals [1]
 millions of years [1]
 heat (and) pressure [1] [3]

Quality of written communication [2]

(b) (i) substance containing only [1] carbon and hydrogen [1] [2]

(ii)

Material	solid	liquid	gas
Polystyrene	✓ [1]		
Petrol		✓ [1]	
Polythene	✓ [1]		
Methane			✓ [1]
Candle wax	✓ [1]		

[5]

AVAILABLE
MARKS

		AVAILABLE MARKS
	(iii) $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$	[3]
	(iv) carbon monoxide	[1]
6	(a) gives out heat	[1]
	(b) (i) A combustion	[1]
	B neutralisation	[1]
	(ii) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$	[3]
	(c) (i) $2\text{Mg} + \text{CO}_2 \rightarrow 2\text{MgO} + \text{C}$	[3]
	(ii) Mg continues to burn [1] white light [1] white [1] solid [1] black specks [1]	max [3]
	(d) (i) magnesium gains oxygen [1] gain of oxygen is oxidation [1]	[2]
	(ii) copper oxide loses oxygen [1] loss of oxygen is reduction [1]	[2]
	(iii) black	[1]
	Total	120
		17
		26