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Rewarding Learning

General Certificate of Secondary Education
2011

Science: Chemistry

Paper 2
Foundation Tier

[G1402]

TUESDAY 7 JUNE, AFTERNOON

MARK SCHEME

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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

e.g. $CaO + H_2O \rightarrow Ca(OH)_2$ [2]
[1] [1]

$CaO + \mathbf{2}H_2O \rightarrow Ca(OH)_2$ [1]
[0] [1]

However:
$2CaO + 2H_2O \rightarrow 2Ca(OH)_2$ [2]
[1] [1]

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

e.g. $2Na + 2H_2O \rightarrow 2NaOH + H_2$
[1] [1]

+ [1] for balancing = [3]

$2Na + H_2O \rightarrow 2NaOH + H_2$
[1] [1]

No balancing mark = [2]

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AVAILABLE MARKS

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]

18

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AVAILABLE MARKS

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]

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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]

21

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]

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AVAILABLE MARKS

(b) **(i)** **F** impure copper [1]
G pure copper [1] [2]

(ii) copper sulphate/copper chloride/copper nitrate [1]

(iii) ductile [1] 18

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) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ [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 *recognisable* pieces of *assembled* 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

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AVAILABLE MARKS

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]

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			AVAILABLE MARKS
(iii) $CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$	[3]		
(iv) carbon monoxide	[1]	26	
6 **(a)** gives out heat	[1]		
(b) **(i)** A combustion	[1]		
B neutralisation	[1]		
(ii) $2H_2 + O_2 \rightarrow 2H_2O$	[3]		
(c) **(i)** $2Mg + CO_2 \rightarrow 2MgO + C$	[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]	17	
	Total	**120**	