Rewarding Learning

General Certificate of Secondary Education
2012

Science: Chemistry

Paper 2
Foundation Tier

[G1402]

FRIDAY 22 JUNE, AFTERNOON

MARK SCHEME

					AVAILABLE MARKS
1	(a)	(i)	iron	[1]	
		(ii)	oxygen	[1]	
		(iii)	water	[1]	
		(iv)	gain of oxygen	[1]	
		(v)	red-brown [1] flaky [1] solid [1]	maximum [2]	
	(b)	(i)	$H_2 + Cl_2 \rightarrow 2HCl$	[3]	
		(ii)	chlorine gains hydrogen [1] gain of hydrogen is reduction [1]	[2]	
		(iii)	chlorine: yellow-green [1] hydrogen: colourless [1]	[2]	
		(iv)	gives out heat	[1]	
	(c)	(i)	thermal [1] decomposition [1]	[2]	
		(ii)	$CuCO_3 \rightarrow CuO + CO_2$	[2]	
		(iii)	green [1] to black [1]	[2]	20

			AVAILABLE MARKS
2	**(a)**	[1] for each of the following in the order given: 4 12 nucleus electrons [4]	
	(b)	**(i)** four/4 [1]	
		(ii) 117 [1]	
		(iii) $\frac{60}{117} \times 100 = 51.28$ (allow 51) [1]	
	(c)	**(i)** $12 + 3 \times 16 = 60$ [1]	
		(ii) $74 - 60 = 14$ [1]	
		(iii) $\frac{14}{2} = 7$ [1]	
		(iv) lithium/Li/Li_2CO_3 [1]	11

AVAILABLE MARKS

3 **(a)** **(i)**

Substance	acid	base	alkali	salt
magnesium chloride				✓ [1]
magnesium hydroxide		✓ [1]		
sodium hydroxide		✓	✓	
	accept either tick for sodium hydroxide [1]			
zinc sulphate				✓ [1]

[4]

(ii) $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ [3]

(iii) magnesium nitrate [1]

(iv) contains water [1]
contains water of crystallisation [2] [2]

(b) **(i)** NH_3 [1]

(ii) 9–11 [1]

(iii) $NH_3 + HNO_3 \rightarrow NH_4NO_3$ [2]

(iv) hydroxide [1]

(c) **(i)** pipette [1]

(ii) remove the indicator [1]

(iii) Individual marks are awarded for correctly labelled and recognisable drawings of assembled apparatus.
No labels = no marks.

evaporating basin [1]
tripod and gauze [1]
heat/Bunsen burner [1] [3]

(iv) solubility decreases/solution becomes saturated [1]

(v) Any **two** from:
dry between two sheets of filter paper [1]
dry in a low temperature oven [1]
dry in a desiccator [1] [2]

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			AVAILABLE MARKS
4	**(a)**	decomposition/breaking down [1] of a substance using electricity [1] [2]	
	(b)	bauxite [1]	
	(c) **(i)**	A is anode [1] B is cathode [1] C is casing [1] D is (molten) aluminium [1] [4]	
	(ii)	ions are free to move [1] idea that ions are the charge carriers [1] [2]	
	(iii)	900–1000 °C [1]	
	(iv)	lower melting point of aluminium oxide/increase conductivity [1]	
	(v)	Positive electrode: oxide [1] Negative electrode: aluminium [1] [2]	
	(vi)	electrode: anode [1] equation: $C + O_2 \rightarrow CO_2$ [2]	
	(vii)	aluminium is tapped off [1] at the bottom of the cell [1]	17

AVAILABLE MARKS

5 (a)

Gas	Formula	Use	Physical properties	
carbon dioxide	CO_2 [1]	dry ice/carbonated drinks/fire extinguishers [1]	Any **two** from: colourless odourless acidic denser than air slightly soluble in water	[4]
hydrogen	H_2 [1]	weather balloons/ rocket fuel [1]	Any **two** from: colourless odourless neutral less dense than air insoluble in water	[4]

(b)

Gas	Test	Result of positive test	
carbon dioxide	bubble into **limewater** [1]	milky [1]	[2]
hydrogen	apply a lit splint [1]	pop [1]	[2]
hydrogen chloride	glass rod dipped in **concentrated** [1] **ammonia** [1]	white [1] smoke [1]	[4]
water	**anhydrous copper sulphate** [1] **or** cobalt chloride paper [1]	white [1] to blue [1] **or** pale blue [1] to pink [1]	[3]

(c) (i) $SO_2 + H_2O \rightarrow H_2SO_3$ [2]

(ii) Any **two** from:
corrodes statues/buildings [1]
kills fish [1]
kills trees/vegetation [1] [2]

(d) (i) brittle [1]
yellow [1]
solid [1] maximum [2]

(ii) $S + O_2 \rightarrow SO_2$ [2]

(iii) melts/forms a liquid [1]
dark red/brown [1]
blue flame [1]
colourless/misty [1]
pungent/bad smell [1] gas [1] maximum [3]

Quality of written communication [2]

(iv) fungicide/bleach/preservative [1]

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			AVAILABLE MARKS
6	**(a)** solid – regular close packed arrangement [1] gas – few particles well spaced out [1]	[2]	
	(b) **(i)** oxygen	[1]	
	(ii) sulphur	[1]	
	(iii) H_2O	[1]	
	(iv) carbon	[1]	
	(v) liquid	[1]	
	(vi) 114 (°C)	[1]	
	(c) **(i)** dry ice	[1]	
	(ii) from solid to gas [1] on heating [1] **or** from gas to solid [1] on cooling [1]	[2]	
	(iii) iodine	[1]	
	(d) **(i)** 17 (°C) ± 1	[1]	
	(ii) A – solid [1] B – liquid [1]	[2]	
	(iii) boiling	[1]	16
		Total	**120**