CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2014 series

0620 CHEMISTRY

0620/62 Paper 6 (Alternative to Practical), maximum raw mark 60

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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CAMBRIDGE
International Examinations

1 **(a)** beaker (1) [1]

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

(ii) electrodes (1) [1]
allow: conduct electricity / to transfer electrons
ignore: attract ions

(c) hydrogen:

lighted splint (1)

pops (1)

OR

chlorine:

litmus (1)

bleached (1) [2]

(d) diagram to show test-tubes above electrodes (1)

containing liquid (1) [2]

2 **(a)** pipette / burette (1) [1]
ignore: measuring cylinder

(b) Universal / pH indicator / pH paper / full range (1) [1]
ignore: indicator
not: other named indicator

(c) pH value rises / increases / becomes more alkaline (1)

steep change in middle (1) [2]
allow: suddenly / drastically / quoted figures

(d) (i) end / neutralisation / equivalence point / becomes neutral (1) [1]
allow: reaction finished / changes from acid to alkali / basic

(ii) 12.5 (1)

cm^3 (1) [2]

(iii) potassium hydroxide solution is 2 × (1)

more concentrated / stronger (1) ORA

half volume of potassium hydroxide used / twice volume of nitric acid used (1) [3]

(e) evaporation / steam (1)

solid / crystals formed (1) [2]
allow: decomposes or named products

3 (a) Bunsen / burner (1) [1]
ignore: heat / heater

(b) not pure / not just ethene (1)
not: a different alkane or alkene is formed first

contains air (from the tube when heated) (1) [2]
ignore: oxygen

(c) catalyst / to provide a large surface area (1) [1]

(d) bromine (water) (1)
not: bromide

colourless / decolourised in alkene **or** stays orange in alkane (1) [2]
allow: colour change ecf

4 **(c)** Experiment 1: Table of results

initial temperature boxes completed correctly (2) 27, 28, 31, 30, 31

highest temperature boxes completed correctly (2) 33, 36, 42, 45, 49

temperature changes correct (1) 6, 8, 11, 15, 18 [5]

(d) All points correctly plotted (3)
guidance: 5 correct (3); 4 correct (2); 3 correct (1); 2 or fewer correct (0)

best fit straight line graph drawn with a ruler (1) [4]
note: does not need to go through origin

(e) value from graph (1), e.g. 21

^{o}C (1)

extrapolation to 8 cm / indication shown (1) [3]

(f) magnesium smaller / disappears / fizzing / bubbles / effervescence (1) [1]
ignore: gas

(g) **(i)** Experiment 5 (1) [1]
allow: 7 cm

(ii) more / most / longest / 7 cm magnesium used (1) [1]
ignore: reactant / sulfuric acid / surface area

(h) temperature change / reaction faster (1)
ignore: temperature rise

more surface area (1) [2]

(i) 3 (^{o}C)
allow: 2–5

(j) shows gas collected over water (1)

in labelled measuring cylinder / graduations shown on collection vessel (1)

OR

shows gas collected in a gas syringe (1)

in labelled (gas) syringe / graduations shown (1) [2]

(k) error…heat losses / using measuring cylinder / oxide layer (1)
ignore: initial temperature

improvement…insulation / use burette or pipette / clean / repeat (1) [2]

5 (b) pH paper turns blue / pH > 7 / reference to smell of the gas (1) [1]

(c) (i) paper turns blue / pH > 7 (1)

reference to smell of gas (1)
ignore: fizzing

(ii) white (1)

precipitate (1)

(f) zinc (1)
allow: Zn^{2+}
ignore: incorrect formulae

carbonate (1)
allow: CO_3^{2-}
ignore: incorrect formulae

6 crush (1)

with…pestle and mortar / hammer

OR

reason…to increase the surface area / to make smaller pieces / to increase the rate of reaction (1) [2]

Followed by:

heat (1)

with carbon (1)

any **two** from: carbon is more reactive / displaces Pb / takes away oxygen / forms carbon dioxide / reduction (2) [4]

OR

heat (1)

with a named metal between Mg and Pb in reactivity series, e.g. Fe (1)

more reactive / displaces Pb / takes away oxygen / reduction (1)

separation of Pb and metal oxide (1) [4]
allow: heat to melt lead and run off / decant

OR

heat (1)

with carbon / CO (1)

PbO (1)

heat with carbon / CO (1) [4]

OR

heat (1)

with iron (1)

PbO (1)

separation (1) [4]

OR

dilute acid (1)
allow: any dilute acid
ignore: heating

$Pb^{2+}_{(aq)}$ / salt / solution (1)

iron (1)

displaces lead (1) [4]

OR

dilute acid (1)
allow: any dilute acid
ignore: heating

$Pb^{2+}_{(aq)}$ / salt / solution (1)

electrolysis (1)
ignore: heating

lead deposited (at cathode) (1) [4]