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- When the name of a chemical is demanded by the question, a **correct** formula is usually acceptable. When the formula is asked for, the name is not acceptable.
- When a word equation is required a **correct** symbol equation is usually acceptable. If an equation is requested then a word equation is not usually acceptable.
- An incorrectly written symbol, e.g. NA or CL, should be penalised once in a question.

In the mark scheme if a word or phrase is underlined it(or an equivalent) is required for the award of the mark.

(.....) is used to denote material that is not specifically required.

**OR** designates alternative and independent ways of gaining the marks for the question.

**or** indicates different ways of gaining the same mark.

**COND** indicates that the award of this mark is conditional upon a previous mark being gained.

- Unusual responses which include correct Chemistry that answers the question should always be rewarded-even if they are not mentioned in the marking scheme.
- All the candidate's work must show evidence of being marked by the examiner.

- 1 (a) (i) Any metal above aluminium Na, K, Ca, Mg etc [1]
- (ii) If (i) is correct then word equation [1]
- (iii) conseq to (i) symbol equation [2]  
If not balanced **ONLY** [1]
- (b) (i)  $Al^{3+} + 3e \Rightarrow Al$  [2]  
For  $Al^{3+}$  **ONLY** [1] anywhere in equation
- (ii) bauxite [1]
- (iii) molten **or** liquid **or** fused **or** homogeneous [1]  
cryolite [1]
- (iv) oxygen from oxide **or** formed at anode **or** implied it is formed [1]  
carbon (anode) to form carbon dioxide [1]
- (c) (i) packaging of food **or** window frames **or** roofs [1]  
accept "cans"  
**NOT** aircraft cars etc
- (ii) low density [1]  
light alloys for aircraft [1]  
**or** electrical cables  
good conductor  
**or** foil  
malleable  
**or** cooling utensils

**CAMBRIDGE**  
INTERNATIONAL EXAMINATIONS

**JUNE 2002**

**INTERNATIONAL GCSE**

**MARK SCHEME**

**MAXIMUM MARK : 80**

**SYLLABUS/COMPONENT : 0620/2**

**CHEMISTRY  
(CORE)**



UNIVERSITY of CAMBRIDGE  
Local Examinations Syndicate

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- 1 (a) splint relights/ glows brighter;  
litmus paper bleaches/ goes white;  
NOT: goes red  
(bubble through) limewater.  
ALLOW: calcium hydroxide [3]
- (b)(i) A [1]  
(ii) D [1]  
(iii) carbon dioxide [1]  
ALLOW: D
- (c)(i) (diagram showing electrons as dots, crosses, dashes etc with)  
2 electrons in inner shell + 8 electrons in middle shell;  
7 electrons in outer shell [2]  
(ii) 2 joined atoms with correct number of outer electrons;  
1 pair of bonding electrons [2]
- (d)(i) (melting point will be) high [1]  
(ii) (boiling point will be)(very) low [1]  
(iii) will conduct electricity [1]  
ALLOW: good / high  
NOT: poor/ bad conductor
- 2 (a)(i) copper [1]  
ALLOW: zinc  
ALLOW correct symbols  
(ii) arsenic/ As [1]  
(iii) 76 (%) [1]
- (b) copper too soft (alone)/ alloying hardens or strengthens/ more resistant to corrosion [1]  
NOT: heat resistant/ higher melting point/ don't conduct heat as well  
NOT: reference to rusting
- (c) C [1]
- (d)(i) O<sub>2</sub> [1]  
(ii) copper(II) chloride + water (1 mark each) [2]  
ALLOW: copper chloride  
NOT: steam  
NOT: copper(I) chloride  
(iii) reacting with an acid/ neutralising acid [1]  
NOT: it is alkaline / metal oxides are basic  
NOT: symbol equation
- (e) (fractional) distillation [1]
- (f)(i) ALLOW low level answer referring to only one of changes e.g  
vibrate more/ move faster/ greater movement [1]  
(ii) Any two of description of proximity of particles in any of (s), (l) or (g) but it must be  
made clear which state is being referred to e.g.  
Solid: particles close together/ touching;  
Liquid: particles close together  
ALLOW: begin to spread/ (slightly) more spaced (than in solid);  
Gas: particles far apart / (completely) spread out /spaced more (than in a liquid)[2]

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- (iii) Any two of description of arrangement of particles in any of (s), (l) or (g) but it must be made clear which state is being referred to e.g.  
 solid: regularly arranged;  
 ALLOW: particles lined up  
 NOT: close together  
 liquid: randomly arranged/ no fixed arrangement  
 NOT: looser  
 gas: randomly arranged/ no fixed arrangement  
 NOT: looser [2]
- 3 (a) 19; 20; 19 [3]
- (b)(i) hydrogen / H<sub>2</sub> [1]  
 NOT: H
- (ii) measure volume of gas (in syringe)/ take syringe readings/ how far syringe moves;  
 NOT: 'using the syringe'  
 NOT: releasing more gas  
 for (same) time period; (or same volume for different time);  
 some idea of keeping conditions the same/ same amounts of materials/ same temperature [3]
- (iii) increases (down the group) [1]  
 ALLOW: more violent / greater/ faster  
 NOT: reaction gets stronger
- (c)(i) neutralisation / acid-base [1]  
 ALLOW: exothermic  
 NOT: redox
- (ii) base [1]
- (iii) 3<sup>rd</sup> and 4<sup>th</sup> boxes ticked (1 each) [2]
- 4 (a) substance which releases energy when it burns/ combusts [1]  
 ALLOW: releases heat when it burns  
 NOT: it is flammable  
 NOT: substance which releases energy  
 NOT: substance that creates energy
- (b)(i) glucose [1]  
 NOT: sugar/ sucrose/ fructose etc  
 NOT: C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>
- (ii) catalysts/ definition of catalyst; from living things / proteins [2]  
 (biological catalyst = 2)  
 NOT: (enzyme) is a living thing/ bacteria etc
- (c) distillation [1]  
 ALLOW: description of distillation e.g. boiling and condensing  
 NOT: heating/ evaporating and condensing UNLESS temperature of 79°C or above mentioned
- (d) Any 2 reasons [2]  
 e.g. less polluting OR less smell OR less fumes;  
 ALLOW: no sulphur dioxide  
 NOT: doesn't produce nitrogen oxides  
 conserve supplies of petrol;  
 petrol useful for other things e.g. making plastics;  
 alcohol can be made from renewable resources;  
 NOT: does not cause pollution  
 NOT: does not produce carbon monoxide  
 NOT: flammability comparison

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- (e) hydrogen/ methane/ LPG/ DERV  
ALLOW: natural gas  
ALLOW: diesel  
NOT: electricity  
NOT: gas [1]
- (f) nitrogen oxides: acid rain/ breathing difficulties etc;  
NOT: kills/ pollution  
lead compounds: damage to brain (in children) / damage to nervous system/ liver [2]  
NOT: kills / pollution
- 5 (a) 1(g) [1]
- (b)(i) correct displayed formula [2]  
(correct displayed formula except  $-O-H$  shown as  $-OH = 1$ )  
(ii) OH / alcohol(ic)/ hydroxyl [1]  
NOT: OH / hydroxide / alcohols
- (c) ring around COOH [1]
- (d) carbon, hydrogen, sulphur, oxygen, sodium [2]  
4 correct = 1  
NOT: symbols
- (e)(i) addition [1]  
(ii) orange/ orange-red/ red/ brown;  
NOT: yellow [2]  
to colourless / decolourized  
NOT: clear  
(iii) has a double bond [1]  
ALLOW: unsaturated  
(iv) covalent; molecular [2]  
(v) compounds; functional [2]
- 6 (a)  $KMnO_4$  dissolves / idea of particles released from surface of crystals/  $KMnO_4$  soluble;  
diffusion; [3]  
explanation of diffusion in terms of movement of water/ solute molecules  
ALLOW: potassium manganate particles spread out through water  
NOT: bald 'potassium manganate particles spread out'  
NOT: references to osmosis/ moving from strong to weak solutions
- (b) evaporation [1]  
ALLOW: crystallization  
NOT: distillation
- (c) 158 [1]
- (d) 2 on left hand side [1]
- (e) Any three of [3]  
high(er) melting/ boiling points;  
greater density/ high density;  
form coloured compounds NOT they are coloured;  
variable oxidation numbers/ form several types of compounds with same elements/  
variable valency/ more than one (positive) ion;  
catalytic activity

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- (f)(i) suitable workable apparatus e.g. test tube or other vessel with bung and delivery tube with source of heating; [3]  
 NOT: open test tubes etc leading to delivery tube  
 NOT: completely closed apparatus  
 surface for cooling e.g. delivery tube/ condenser/ plate suitably placed;  
 receptacle for collecting water
- (ii) can be made to go in the opposite direction / can be made to go in either direction/  
 can go backwards or forwards/ products change back to reactants [1]  
 NOT: can be reversed
- (iii) blue;  
 to white; [2]  
 NOT: to colourless/ clear / decolourises