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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)**

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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) O₂ [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 / H₂ [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) 3rd and 4th 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: C₆H₁₂O₆
- (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
to colourless / decolourized [2]
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;
explanation of diffusion in terms of movement of water/ solute molecules [3]
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
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 [3]

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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