edexcel

Mark Scheme (Results)

Summer 2016

Pearson Edexcel GCSE in Chemistry (5CH1F) Paper 01
Unit C1: Chemistry in Our World

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- For questions worth more than one mark, the answer column shows how partial credit can be allocated. This has been done by the inclusion of part marks eg (1).
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Quality of Written Communication

Questions which involve the writing of continuous prose will expect candidates to:

- Write legibly, with accurate spelling, grammar and punctuation in order to make the meaning clear
- Select and use a form and style of writing appropriate to purpose and to complex subject matter
- Organise information clearly and coherently, using specialist vocabulary when appropriate.

Full marks will be awarded if the candidate has demonstrated the above abilities.

Questions where QWC is likely to be particularly important are indicated (QWC) in the mark scheme, but this does not preclude others.

Question Number	Answer	Acceptable answers	Mark
1(a)(i)	bar drawn on the graph for nitrogen, to 78 ± ½ small square	**Ignore** width of line	**(1)**

Question Number	Answer	Acceptable answers	Mark
1(a)(ii)	C 21		**(1)**

Question Number	Answer	Acceptable answers	Mark
1(b)	An explanation linking (growth of primitive) plants **(1)** photosynthesis/ (plants take in carbon dioxide and) release/let out/produce oxygen **(1)**	 **Allow** trees **Reject** people planting **Reject** respiration/breathing	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(i)	A description linking carbon (atom) **(1)** and oxygen (atoms) **(1)**	**Ignore** numbers of atoms/ symbols molecules = 1 mark max	**(2)**

Question Number	Answer	Acceptable answers	Mark
1(c)(ii)	**Both answers must come from the same pair.** An explanation linking any one of the following pairs burning/combustion **(1)** (fossil) fuels **(1)** **OR** deforestation/cutting down trees **(1)** reduces {the amount of carbon dioxide taken in/photosynthesis} **(1)** **OR** farming /increased {human/animal} population **(1)** breathing / respiration /exhaling carbon dioxide /decaying/decomposing **(1)** **OR** waste/dead organisms **(1)** decaying/rotting (in landfill) **(1)** **OR** limestone **(1)** decomposed/heated (in lime kiln) **(1)** **OR** volcano/volcanic **(1)** eruption(s) / activity / emits gas **(1)**	**Ignore** additional correct answers Maximum 1 mark if additional incorrect answers needs reference to burning **Ignore** driving/cars/pollution **Allow** named fossil fuel/any fuel that contains carbon **Ignore** other human activities	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(a)	B sodium hydroxide		**(1)**

Question Number	Answer	Acceptable answers	Mark
2(b)	hydrochloric acid LHS **(1)** carbon dioxide RHS **(1)**	**Allow** correct formulae HCl **(1)** CO_2 **(1)** **Reject** hydrolic acid, HCL, hCl, carbon oxide, CO2, co2, Co2 and CO^2	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)(i)	**glowing** splint **(1)** MP1 relights **(1)** MP2 MP2 dependent on MP1	**Ignore** burned out/blown out splint lighted splint burns brighter **(2)**	**(2)**

Question Number	Answer	Acceptable answers	Mark
2(c)(ii)	A description linking • (volumes of oxygen and/or hydrogen) increase/bigger/goes up **(1)** • volume of hydrogen (evolved) is always greater than the volume of oxygen **(1)** **OR** A correct quantitative description/relationship linking volumes or time and volume • volume of hydrogen (evolved) is always double that of oxygen/ volume of oxygen is half that of hydrogen **(2)**	just quoting numbers does not show a relationship	**(2)**

	• as time increases the volume (of gas/oxygen /hydrogen) evolved increases OWTTE **(2)** • as the time doubles the volume(s) (of gas/both gases/oxygen / hydrogen) doubles **(2)** • volume (of gas evolved) is (directly) proportional to time **(2)**		

Question Number	Answer	Acceptable answers	Mark
2(d)	chlorine **(1)**	**Allow** Cl_2 **Reject** chloride, Cl, cl, cL	**(1)**

Question Number	Answer	Acceptable answers	Mark
3(a)	B C_2H_6		**(1)**

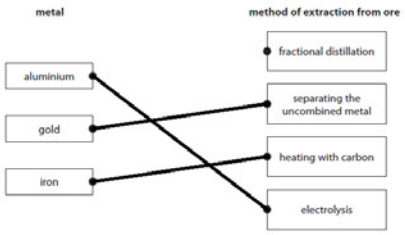
Question Number	Answer	Acceptable answers	Mark
3(b)(i)	fractional distillation **(2)**	**Allow** recognisable spellings distillation /fractionation **(1)**	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(b)(ii)	B cars aircraft		**(1)**

Question Number	Answer	Acceptable answers	Mark
3(c)(i)	propane + oxygen **(1)** {→ / =} carbon dioxide + water **(1)**	**Allow** reactants / products in either order, e.g. oxygen + propane LHS $C_3H_8 + O_2$ **(1)** RHS {→ / =} $CO_2 + H_2O$ **(1)** **Ignore** incorrect / no balancing **Reject** incorrect formulae. e.g. h^2O, h_2O, H_{20}, CO2, CO^2 and Co_2 If a mixture of words and formulae are used, max 1 mark	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(c)(ii)	C_3H_8 (2)	C and H only with non subscripted/ incorrect / no numbers (1) **Allow** H_8C_3/correct structural/ displayed formula **Reject** 'h' for H	**(2)**

Question Number	Answer	Acceptable answers	Mark
3(d)	**Both marks must come from the same pair.** An explanation linking one of the following pairs **EITHER** carbon monoxide/CO formed **(1)** toxic/poisonous / restricts the amount of oxygen carried (by the blood)/replaces oxygen in the blood/binds to red blood cells or haemoglobin/causes death **(1)** **OR** smoke/soot formed **(1)** damages lungs/chokes people/breathing difficulties/makes things dirty **(1)**	**Ignore** additional correct answers maximum 1 for additional incorrect answers **Ignore** carbon dioxide **Ignore** dangerous/harmful **Allow** the second mark if an incorrect gas e.g. methane **Allow** second mark if "gas" stated but no name is given **Allow** kills **Allow** less energy released **Allow** carbon **Ignore** harmful/dangerous **Allow** blocks fuel jets **Allow** less energy released	**(2)**

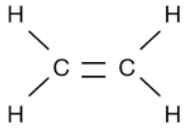
Question Number	Answer	Acceptable answers	Mark
4(a)		if more than one line drawn from/to any metal/method of extraction no marks can be scored **for that metal/method of extraction**	**(3)**

Question Number	Answer	Acceptable answers	Mark
4(b)(i)	(zinc oxide +) **carbon** (→) **(1)** (zinc +) **carbon dioxide** / **monoxide (1)**	**Allow** correct symbol, C **(1)** **Ignore** carbon oxide **Allow** correct formula, CO_2 /CO **(1)**	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(b)(ii)	reduction		**(1)**

Question Number	Answer	Acceptable answers	Mark
4(c)	Any two from: • (good) electrical conductor **(1)** • ductile/drawn into a wire **(1)** • flexible/bendable **(1)** • unreactive / low reactivity/ resistant to corrosion **(1)** • high melting point/heat resistant **(1)**	**Ignore** (good) thermal conductor /conductor **Ignore** malleable **Ignore** rusting	**(2)**

Question Number	Answer	Acceptable answers	Mark
4(d)	An explanation linking any two of • in pure gold the atoms/particles are all the same size **OR** in pure gold {layers/sheets/rows} (of atoms) {slide/slip/move} (over each other easily) **(1)** • (in the alloy there are two types/different sizes of atom/particle) so {structure/layers/sheets/rows} disrupted in alloy **(1)** • **stops/prevents** {atoms /particles /layers /sheets /rows} {sliding /slipping /moving} (over one another easily in alloy) **(1)**	**Allow** correct particle diagram(s) **Reject** molecules *once*	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(a)1	 **(1)**	**Ignore** bond angles	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)2	propene **(1)**	**Reject** propane	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(a)3	C_4H_8 **(1)**	H_8C_4 numbers must be subscript	**(1)**

Question Number	Answer	Acceptable answers	Mark
5(b)	A description linking (turns) from orange / red / yellow / brown **(1)** to colourless/decolourises **(1)**	**Ignore** extra incorrect observations **Ignore** discoloured/clear/transparent **Allow** stays orange = max 1 mark **Reject** turns orange	**(2)**

Question Number	Answer	Acceptable answers	Mark
5(c)	**B** cracking		**(1)**

Question Number		Indicative Content	Mark
QWC	***5(d)**	A description / explanation including some of the following points **properties related to uses** • **poly(ethene) :** **plastic bags / plastic bottles** – flexible/bendable, inert/unreactive, waterproof/weatherproof, light **insulation for electrical wires** – flexible, bendable, good insulator, waterproof/weather proof, inert/unreactive • **poly(chloroethene) :** **window frames / gutters -** tough/hard, long-lasting, durable/good insulator, waterproof/weatherproof, inert/unreactive **insulation for electrical wires –** flexible /bendable, good insulator, waterproof/weather proof, inert/unreactive • **poly(tetrafluoroethene):** **coating for pans -** slippery, non-stick, tough, high melting point/heat resistant, inert/unreactive **skis -** slippery **stain proofing fabrics and carpets –** slippery **containers for corrosive substances –** inert/unreactive **problems with disposal** **Ignore** references to cost and/or pollution <u>landfill</u> • (in landfill) non biodegradable/do not decay/rot/decompose/break down • waste persists in landfill sites OWTTE • landfill sites take up space or land / new sites needed when old ones filled • destroys habitats <u>burning</u> • (burning polymers) produces carbon dioxide/greenhouse gases • produces carbon monoxide • can release toxic/harmful fumes into the air • produces (toxic) ash <u>recycling</u> (different polymers) need to be separated in order to recycle	**(6)**

Level	0	No rewardable content
1	1 - 2	• a limited description / explanation e.g. one property related to use OR one problem of disposal • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	• a simple description / explanation e.g. an account including at least one properties related to uses and at least one problems with disposal OR a detailed description of at least two different properties related to uses or at least two problems with disposal • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5 - 6	• a detailed description / explanation e.g. an account including at least two different properties related to uses AND at least one problem with disposal OR at least one property related to use AND at least two problems with disposal • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

Question Number	Answer	Acceptable answers	Mark
6(a)	(contains) **fossils** **(1)**	**Allow** ammonite	**(1)**

6(b)	**D** marble		**(1)**

Question Number	Answer	Acceptable answers	Mark
6(c)(i)	thermal decomposition (2)	decomposition (1) **Allow** recognisable spellings	**(2)**

Question Number	Answer	Acceptable answers	Mark
6(c)(ii)	calcium oxide + water **(1)** {→ / =} calcium hydroxide **(1)**	**Allow** reactants in either order, e.g. water + calcium oxide LHS $CaO + H_2O$ **(1)** RHS {→ / =} $Ca(OH)_2$ **(1)** **Ignore** incorrect / no balancing If a mixture of words and formulae are used, max 1 mark	**(2)**

Question Number		Indicative Content	Mark
QWC	***6(d)**	A explanation including some of the following points **causes of acid rain** • burning sulfur/coal (in oxygen/air) • sulfur reacts with oxygen • produces sulfur dioxide • acidic gas • in atmosphere dissolves/mixes/absorbs/reacts in rain/clouds/water • to form acid solution/sulfuric acid/sulfurous acid/credit name/correct formula of an acid formed • sulfur dioxide causes acid rain **effects of acid rain** • damage/erosion/(chemical) weathering of buildings/monuments • acidification of lakes /soil/lowers pH • kills fish/aquatic life • kills/damages trees/ plants/ forests **reduction of the effects of acid rain by limestone** • calcium carbonate (from limestone) • acidic gas passed through calcium carbonate in chimney • (calcium carbonate) neutralises/reacts with acidic gases OWTTE • acidic gases prevented from entering the atmosphere	**(6)**

Level	0	No rewardable content
1	1 - 2	• a limited explanation e.g. at least one valid idea, e.g. a cause, an effect or a method of reduction of acid rain • the answer communicates ideas using simple language and uses limited scientific terminology • spelling, punctuation and grammar are used with limited accuracy
2	3 - 4	• a simple explanation e.g. at least two ideas from one aspect OR a mention of a least two aspects • the answer communicates ideas showing some evidence of clarity and organisation and uses scientific terminology appropriately • spelling, punctuation and grammar are used with some accuracy
3	5 - 6	• a detailed explanation with ideas from all three aspects • the answer communicates ideas clearly and coherently uses a range of scientific terminology accurately • spelling, punctuation and grammar are used with few errors

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