

Chemistry 1 - Foundation tier only questions

| Question Number | | Sub-section | | | Mark | Answer | Accept | Neutral answer | Do not accept |
|-----------------|----|-------------|------|--|------|------------------------------------------------------------------------------------------------|--------|----------------------------|---------------|
| FT | HT | | | | | | | | |
| 1 | | (a) | | | 1 | copper oxide / (black) solid remains copper oxide / (black) solid stops reacting | | an excess blue solution | |
| | | (b) | (i) | | 1 | filter / filtration / filtering | | | |
| | | | (ii) | | 1 | water / H ₂ O (ignore incorrect formula if given with correct name) | | | |
| | | (c) | (i) | | 1 | copper oxide / CuO (ignore incorrect formula if given with correct name) | | | |
| | | | (ii) | | 1 | copper sulfate / CuSO ₄ (ignore incorrect formula if given with correct name) | | water | |

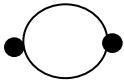
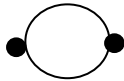
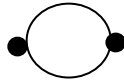
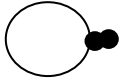
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| FT | HT | | | | | | | |
| 2 | | (a) | | 1 | oxygen | O ₂ | air O | |
| | | (b) | | 2 | sulfur dioxide (1) carbon (1) | SO ₂ C | SO | |
| | | (c) | | 3 | (wood) burns forming carbon dioxide / combustion produces carbon dioxide (1) trees take in carbon dioxide/ photosynthesis uses carbon dioxide (1) 3 rd marking point can only be awarded when first two are given carbon dioxide kept in balance (1) | woods / forests / plants cancels out / remains equal | 'the wood' | |

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| 3 | | (a) | | | 2 | resists corrosion (1) lasts longer than iron (1) – linked to 1 st mark or low density (1) easier to install (1) – linked to 1 st mark | less maintenance / weather resistant | iron rusts doesn't rust forms oxide layer | |
| | | (b) | (i) | | 1 | oxide / O ²⁻ | | | oxygen O ₂ ⁻ |
| | | | (ii) | | 1 | aluminium oxide → aluminium + oxygen | Al ₂ O ₃ → Al + O ₂ (ignore any attempt to balance) | reference to 'molten' aluminium oxide and oxygen 'gas' | |
| | | | (iii) | | 1 | liquid / 1 | | | |
| | | | (iv) | | 1 | lot / large amount of electricity used lot / large amount of energy used electricity is expensive | | a lot of heat needed | |

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| 4 | | (a) | (i) | | 1 | sodium and chloride Na^+ and Cl^- | | | chlorine Na / Cl |
| | | | (ii) | | 1 | NaCl | Na^+Cl^- | | |
| | | (b) | | | 1 | too little present / concentration very small / concentration of iodide ions much smaller than that of chloride / it would take a lot of seawater to get a small amount of iodide from it | reference to chlorine / iodine | reference to cost or energy quoting numbers from table | |

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| 5 | | (a) | (i) | | 1 | any value in the range 40-100 | | a range within the range given e.g. 50-90 | |
| | | | (ii) | | 1 | 15 | C ₁₅ | | |
| | | | (iii) | | 1 | range of boiling points / range of numbers of carbon atoms / chain lengths | | | all fractions have different boiling points |
| | | (b) | | | 1 | 10 (ignore any number written in box) | | | |
| | | (c) | | | 1 | cracking | | | |

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| 6 | | (a) | | 1 | 2.8 | | | 2.6 |
| | | (b) | | 1 | <p>can agree or disagree with statement – mark awarded for reason</p> <p>Yes as percentage fluoridation increases, the mean DMFT decreases</p> <p>or</p> <p>No the mean DMFT decreased most sharply during years when the increase in percentage of children drinking fluoridated water was at its lowest</p> | | | |
| | | (c) | | 2 | <p>any 2 for (1) each up to 2 max</p> <p>(may) cause cancer / bone cancer discolours teeth / fluorosis poisonous at high concentration / (may cause) brittle bones / (may cause) IBS / (may cause) thyroid problems mass medication / takes away freedom of choice / unethical can get fluoride from toothpaste / mouthwash</p> | | | |

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| 7 | | (a) | (i) | 1 | electrolysis | | | |
| | | | (ii) | I | all points plotted correctly $\pm \frac{1}{2}$ square (1) straight line through all points - ruler must be used (1) | | | |
| | | | | II | straight line (ruler used) from (0,0) to (10,10) (2) or straight line from (0,0) and anywhere below hydrogen line (1) | | | |
| | | (b) | | 2 |  correct representation of a water molecule (1)  two water molecules shown (1) | H—O—H 2  | |  |

Chemistry 1 - Common questions

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|-----------------|----|-------------|------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------|-------------------------------|
| FT | HT | | | | | | | |
| 8 | 1 | (a) | | 2 | (silicon difficult to classify) because it has metallic and non-metallic properties (1) response clearly indicating one or more metallic property and contrasting non-metallic property, e.g. it has a high melting point/boiling point like a metal but is brittle like a non-metal (2) | semi-metal / metalloid | | it is a metal and a non-metal |
| | | (b) | | 1 | Mg (ignore atomic number / mass number) | | magnesium | |
| | | (c) | (i) | 1 | 2 | | | |
| | | | (ii) | 1 | Ag ₂ O | Ag ⁺ ₂ O ²⁻ | | |
| | | (d) | (i) | 1 | antibacterial / antiviral / antifungal | kills germs / kills bacteria / antiseptic | disinfectant reduces smells | |
| | | | (ii) | 1 | silver nanoparticles can get into drinking water / water supplies / lakes / rivers could be dangerous to health / harmful / toxic don't know the effect / long term effect not known <i>uncertainty must be implied</i> | | reference to the air / atmosphere / rain pollutes water / the environment | |

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| 9 | 2 | (a) | | 2 | melting points decrease (down the group) / decrease but Mg doesn't fit the pattern (1) boiling points have no trend (1) | | boiling points go up and down | |
| | | (b) | | 2 | extremely fast / explosively / even faster than strontium <i>must imply greater than 'very fast'</i> (1) reactivity increases down Group 2 / reactivity increases down the group / reaction gets quicker down the group (1) | | barium lies below strontium / reaction gets stronger down the group | |

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| 10 | 3 | (a) | (i) | I | 1 | to burn / act as fuel / heat the furnace to form carbon monoxide | to reduce iron ore / iron oxide | | |
| | | | | II | 1 | remove impurities / sand / silica react with impurities / sand / silica | | to form slag purify the iron | |
| | | | (ii) | I | 1 | $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ | | | |
| | | | | II | 1 | iron oxide / iron(III) oxide | | Fe_2O_3 iron ore / haematite | Fe |
| | | (b) | (i) | | 2 | <i>basic comment</i> it increases then decreases (1) <i>higher level comment with use of numerical data</i> it increases to a maximum with 0.8 (% carbon) then decreases / it increases up to 800 (MPa) then decreases (2) | | | |
| | | | (ii) | | 1 | cast iron | | 3.6 | |

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| FT | HT | | |
| 11 | 4 | 6 QWC | <p>Indicative content Reference to useful properties of plastics compared with properties of traditional materials</p> <p>Plastic properties: low density, thermal insulator, electrical insulator, waterproof, strong, easily coloured, non-biodegradable (doesn't corrode, erode or rot), cheap, can now be made biodegradable</p> <p>Properties of plastics vs properties of traditional materials for uses, such as: window frames, electrical wire covering, saucepan handles, drain pipes, buckets, carrier bags, bottles etc.</p> <p>5-6 marks The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks The candidate does not make any attempt or give a relevant answer worthy of credit.</p> |