| Question number | Answer | Notes | Marks |
|---|---|---|---|
| 1 a | C (nitrogen) | | 1 |
| b | A (argon) | | 1 |
| c | **M1** (formula) CuO<br><br>**M2** (colour) black | **ACCEPT** correct formula as a **product** of an equation. The equation need not be balanced<br>**IGNORE** names<br><br>**IGNORE** brown<br>**REJECT** all other colours | 2 |
| d i | C (dilute hydrochloric acid) | | 1 |
| ii | A (calcium carbonate) | | 1 |
| iii | in a (gas) syringe / downward delivery in air | **ALLOW** downward delivery | 1 |
| e i | $CO_2$(**g**) + $Ca(OH)_2$(**aq**) → $CaCO_3$(**s**) + $H_2O$(l) | **ACCEPT** upper case letters<br>**IGNORE** words | 1 |
| e ii | white precipitate forms / liquid goes milky/cloudy | **ACCEPT** usual alternatives for precipitate | 1 |

| Question number | | | | Answer | Notes | Marks |
|---|---|---|---|---|---|---|
| | | | | | | |
| 2 | a | (i) | M 1 | nitrogen | | 1 |
| | | | | | | |
| | | (ii) | M 1 | cross in 2nd box (20) | | 1 |
| | | | | | | |
| | | (iii) | M 1 | unreactive | | 1 |
| | | | M 2 | water | | 1 |
| | | | | | | |
| | b | (i) | M 1 | sulfurous acid / $H_2SO_3$ | Accept sulfuric(IV) acid<br>Accept ph spellings<br>If name and formula given, both must be correct | 1 |
| | | | | | | |
| | | (ii) | M 1 | nitrogen oxide(s) / nitrogen dioxide / $NO_2$ / $NO_x$ | Ignore nitrogen monoxide / nitrous oxide and other acidic gases, eg carbon dioxide, sulfur trioxide, hydrogen chloride | 1 |
| | | | | | | |

| Question number | | | | Answer | Notes | Marks |
|---|---|---|---|---|---|---|
| 2 | b | (iii) | M 1 | iron/steel/metal corrodes/rusts/reacts | Ignore physical process such as erosion/weathering/wearing away/dissolving<br>Ignore burns/burning | 2 |
| | | | M 2 | limestone/marble reacts/corrodes/is eaten away<br>NOT just buildings | Ignore rusts or physical process such as erosion/weathering/wearing away/dissolving<br>Ignore burns/burning | |
| | | | M 3 | plants/trees/vegetation/crops/named example adversely affected in specific way, eg dies/stunted growth/harmed/damaged | Ignore deforestation<br>Ignore leaching minerals | |
| | | | M 4 | fish/aquatic animals/pond life/marine life/named example affected in specific way, eg dies/stunted growth/harmed/damaged | Ignore references to just animals | |
| | | | | | Accept destroys as an adverse effect for all marks | |
| | | | | | Any two for 1 each | |
| | | | | | **Total 8 marks** | |

| Question number | Answer | Accept | Reject | Marks |
|---|---|---|---|---|
| 3 (a) (i) | to allow air / oxygen to enter (the crucible) / to come into contact with the magnesium / solid<br>Ignore references to visual checks of reaction completion | to allow the magnesium to burn / react<br>to make sure that the (all) magnesium has reacted | | 1<br>1 |
| (ii) | to make sure that <u>all</u> of the magnesium has reacted | to complete the reaction | | |
| (b) | mass of crucible (and lid) + MgO — mass of crucible (and lid)<br>lids must be in both or neither<br>ignore any references to the table of results on page 8 | mass of crucible (and lid) at end — mass of crucible (and lid) | | 1 |
| (c) (i) | all points plotted correctly to nearest gridline (subtract 1 mark for each error) | | | 2 |
| | <u>correct</u> straight line of best fit (need not pass through origin)<br>(must be drawn with the aid of a rule) | line as evidence of correct plotting when points cannot be seen | | 1<br>1 |
| (ii) | anomalous point at (0.26, 0.64) circled | | | 1 |
| (iii) | csq on candidate's graph<br>Units not needed, ignore incorrect units | | | |
| | | | **Total** | **8** |