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the examination. It shows the basis on which Examiners were instructed to award marks. It does not
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1. (a) suitable collection vessel, e.g. syringe / measuring cylinder, burette, test tube or gas jar in trough of water or by downward delivery (1) label (1) [2]

(b) tap / separating / dropping funnel (1) [1]

(c) reaction is fast at room temperature (1) [1]

allow: heat not needed / reacts anyway

(d) limewater (1)

turns milky / cloudy / white (1) [2]

2. (a) mass of beaker + contents column completed correctly

all 11 correct (2)

10 correct (1)

9 or fewer correct (0)

total loss column correct (1) [3]

note: if all readings are not to 1dp, max 2

time / min mass / g total loss / g

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<tr>
<td>10</td>
<td>90.0</td>
<td>5.0</td>
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</tbody>
</table>

(b) points plotted correctly including origin (2)

smooth curve missing anomalous point (1) [3]

(c) gas / carbon dioxide evolved / formed / escapes / given off (1) [1]

(d) (i) result at 4 minutes / fifth point / 91.2 / 3.8 g [1]

(ii) 4.2 (g) ± 0.1 (1) [1]

(e) sketch with steeper graph than original (1)

starting at origin levelling at same height (1) [2]
3  (a)  carbon / graphite (1)  

(b)  bulb lights / fizzing / bubbles (1)  
**ignore**: names of electrodes  
**allow**: solution gets paler / changes colour / green colour fades  

(c)  copper (1)  
negative electrode / cathode (1)  

(d)  electrolysis (1)  

4  (c)  table of results  

- initial temperature boxes completed correctly (1)  
  21, 22, 22, 19  
- final temperature boxes correctly completed (1)  
  41, 16, 11, 32  
- differences correct (1)  
  20, –6, –11, 13  

(e)  suitable scale – 2 cm is 5 or 10 °C (1)  
all 4 bars at correct levels (2),  
3 correct (1)  
2 or fewer correct (0)  
clear unambiguous labels, HJKL or 1, 2, 3, 4 (1)  

(f)  to remove impurities / clean (1)  

(g)  (i)  Experiment 2 / J (1)  

(ii)  Experiments 2 / J and 3 / K (1)  
temperature decreased / energy or heat is absorbed (1)  

(h)  (i)  (–)5.5 (°C) (1)  

(ii)  (+)6.5 (°C) (1)  

(iii)  half amount of solid used (1)  

(i)  room temperature / initial temperature / 22 °C (1)  
reaction finished / all dissolved (1)
(j) carbonate (1)
carbon dioxide (1)
acid (1) max [2]

(k) repeat (1)
compare results / average results / mean (1) [2]

5 tests on solution N

(e) appearance colourless (1) [1]
pH 11–14 (1) [1]

(f) colourless / no change (1)
white (1)
precipitate (1) [3]

(g) litmus paper turns blue (1)
pungent smell (1) [2]

(h) (i) hydrogen / H₂ (1) [1]
(ii) ammonia (1) [1]

(i) hydrochloric acid (2) [2]
acid or chloride only, 1 mark.

6 (a) add water (1)
allow: named organic solvent
crush / grind stir / mix / heat plant material / description of (1)
filter (1)
extract each plant material separately / named apparatus (1) [4]

(b) add extract to acid (1)
add extract to alkali (1)
different colours shows suitable indicator (1) [3]
allow: named colours