

# Mark Scheme (Results)

January 2013

International GCSE Chemistry (4CH0)  
Paper 2C

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| Question number | Expected Answer                                                                       | Accept                                                                                                                       | Reject                  | Marks    |
|-----------------|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------|
| 1 (a)           | bar drawn at height of 32<br>bar drawn at height of 8<br>bar drawn at height of 62-64 | 2 marks for all 3<br>1 mark for any 2<br><br>horizontal lines at correct heights<br>vertical lines ending at correct heights |                         | 2        |
| (b)             | <b>M1</b> - capric <u>AND</u> palmitic solid                                          | S                                                                                                                            | any other state symbols | 1        |
|                 | <b>M2</b> - formic liquid                                                             | I                                                                                                                            |                         | 1        |
|                 |                                                                                       |                                                                                                                              | <b>Total</b>            | <b>4</b> |

| Question number | Answer                                                                                                                                        | Accept                                                                                                                                   | Reject                 | Marks      |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------|
| 2 (a) (i)       | D                                                                                                                                             | d                                                                                                                                        |                        | 1          |
| (ii)            | A                                                                                                                                             | a                                                                                                                                        |                        | 1          |
| (b)             | <b>M1</b> - B<br><br><b>M2</b> - the spots do not line up (with any of the blue, red or yellow spots)<br><br><b>M2</b> dependant on <b>M1</b> | b<br><br>the colours do not match (with any one of blue, red or yellow)<br>the spots are not the same (as those for blue, red or yellow) | contains other colours | 1<br><br>1 |
|                 |                                                                                                                                               |                                                                                                                                          | <b>Total</b>           | <b>4</b>   |

| Question number | Answer                                                                                                                                                                           | Accept                                                                                                    | Reject                             | Marks    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|------------------------------------|----------|
| 3 (a) (i)       | <b>M1</b> - at least two layers of circles drawn with the majority touching one another                                                                                          |                                                                                                           |                                    | 1        |
|                 | <b>M2</b> - no regular pattern <b>overall</b>                                                                                                                                    |                                                                                                           |                                    | 1        |
|                 | (ii) (particles/they are) <u>more</u> closely packed<br>or<br>(particles they are) <u>closer</u> together<br>or<br><u>more</u> (particles of them) in a given volume/in the tank | <u>less</u> space between particles, etc<br><br>molecules or atoms for particles<br><br>reverse arguments | oxygen in place of particles       | 1        |
| (b) (i)         | <b>M1</b> - bright/brilliant/blinding/white flame                                                                                                                                | light for flame                                                                                           | any other colour<br>glow for flame | 1        |
|                 | <b>M2</b> - <u>white</u> powder / solid / smoke / ash                                                                                                                            |                                                                                                           |                                    | 1        |
| (ii)            | MgO                                                                                                                                                                              | correct formula as part of an equation                                                                    |                                    | 1        |
| (c) (i)         | base/alkali                                                                                                                                                                      | basic/alkaline<br>(it) forms hydroxide ions (in water)                                                    | contains hydroxide ions            | 1        |
|                 | (ii) $\text{OH}^-$ / hydroxide                                                                                                                                                   |                                                                                                           |                                    | 1        |
|                 |                                                                                                                                                                                  |                                                                                                           | <b>Total</b>                       | <b>8</b> |

| Question number | Answer                                                                                                                                                         | Accept                                                                              | Reject                                   | Marks |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------|-------|
| 4 (a)           | <b>M1</b> - bubbles (of gas) / fizzing / effervescence                                                                                                         | gas/carbon dioxide given off                                                        |                                          | 1     |
|                 | <b>M2</b> - <u>lump/calcium carbonate/solid</u> disappears/gets smaller                                                                                        | dissolves<br>forms a colourless solution                                            |                                          | 1     |
| (b)             | <b>M1</b> - (bubble through) limewater/calcium hydroxide <b>solution</b>                                                                                       |                                                                                     |                                          | 1     |
|                 | <b>M2</b> - (goes) milky/cloudy/chalky<br><br>M2 dependent on M1 or near miss, e.g. $\text{Ca(OH)}_2(\text{s})$<br>IGNORE references to lighted spill goes out | <b>white</b> precipitate/<br>suspension/solid (formed)                              |                                          | 1     |
| (c)             | time <b>increases</b> , mass <b>decreases</b><br><br>IGNORE references to mass eventually stops decreasing                                                     | reverse statement<br>mass decreases with time<br>(they have a) negative correlation | mass goes down with no reference to time | 1     |
| (d) (i)         | 3.3 to 3.5                                                                                                                                                     | 3 min 18s to 3 min 30s                                                              |                                          | 1     |
| (ii)            | lump/calcium carbonate/solid <u>completely</u> reacted                                                                                                         | used up/has gone                                                                    | has dissolved (both) reactants used up   | 1     |

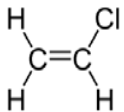
| Question Number | Answer                                                                                      | Accept                                                      | Reject                                                   | Marks     |
|-----------------|---------------------------------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------|-----------|
| 4 (e) (i)       | calcium chloride <b>AND</b> hydrochloric acid                                               | hydrogen chloride for hydrochloric acid<br>correct formulae |                                                          | 1         |
|                 | IGNORE carbon dioxide / carbonic acid / calcium carbonate                                   |                                                             |                                                          |           |
|                 | (ii) calcium chloride <b>AND</b> hydrochloric acid<br>IGNORE carbon dioxide / carbonic acid | hydrogen chloride for hydrochloric acid<br>correct formula  | calcium carbonate                                        | 1         |
| (f)             | <b>M1</b> - steeper curve to left of original starting at, or close to (100,0)              |                                                             |                                                          | 1         |
|                 | <b>M2</b> - levels at 98.4 g                                                                |                                                             | curves that 'dip' below 98.4 by more than ½ small square | 1         |
|                 |                                                                                             |                                                             | <b>Total</b>                                             | <b>11</b> |





| Question Number | Answer                                                                                      | Accept                           | Reject         | Marks     |
|-----------------|---------------------------------------------------------------------------------------------|----------------------------------|----------------|-----------|
| 5 (c)           | <b>M1</b> - dissolve both (lead(II) nitrate and sodium chloride) in water                   | dissolve one in water            |                | 1         |
|                 | penalise <b>M1</b> if any other reagents added                                              |                                  |                |           |
|                 | <b>M2</b> - mix/add (the two solutions)                                                     | react                            |                | 1         |
|                 | <b>M3</b> – filter                                                                          | decant                           |                | 1         |
|                 | <b>M4</b> - wash <u>residue/solid/lead ((II)) chloride</u> (with deionised/distilled water) |                                  |                | 1         |
|                 | <b>M5</b> - dry on filter paper/in a (warm) oven/leave to dry /heat                         | other sensible methods of drying | strong heating | 1         |
|                 |                                                                                             |                                  | <b>Total</b>   | <b>12</b> |

| Question number | Answer                                                                                                                                                                            | Accept                                                                                                                                                   | Reject                                                 | Marks |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------|
| 6 (a)           | $C_{12}H_{22}O_{11} + H_2O \rightarrow 2C_6H_{12}O_6$<br>Ignore yeast                                                                                                             |                                                                                                                                                          | lower case symbols and numbers not given as subscripts | 1     |
| (b) (i)         | no more bubbles/fizzing/effervescence<br>IGNORE when no more ethanol is formed/all the glucose has reacted/all the yeast has reacted/references to mass/references to temperature | no more gas/carbon dioxide given off                                                                                                                     |                                                        | 1     |
| (ii)            | filtration/filtering<br>IGNORE sieving                                                                                                                                            | decant                                                                                                                                                   | evaporation/distillation                               | 1     |
| (c) (i)         | (the elements of) water removed                                                                                                                                                   | H <sub>2</sub> O removed<br>2 hydrogen (atoms) and 1 oxygen (atom) are removed                                                                           |                                                        | 1     |
| (ii)            | aluminium oxide/Al <sub>2</sub> O <sub>3</sub>                                                                                                                                    | (concentrated) sulfuric acid<br>(concentrated) phosphoric acid                                                                                           | dilute acid<br>phosphorus/phosphorous                  | 1     |
| (iii)           | chlorine (gas) / Cl <sub>2</sub><br>If both name and formula given, both must be correct                                                                                          | correct name or formula as part of an equation                                                                                                           | chloride / Cl <sup>-</sup>                             | 1     |
| (iv)            | CH <sub>2</sub> ClCH <sub>2</sub> Cl → CH <sub>2</sub> (=)CHCl + HCl                                                                                                              | C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub> for CH <sub>2</sub> ClCH <sub>2</sub> Cl and<br>C <sub>2</sub> H <sub>3</sub> Cl for CH <sub>2</sub> =CHCl |                                                        | 1     |

| Question Number | Answer                                                                                                                                                                                                                                                                                       | Accept | Reject       | Marks     |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|-----------|
| (d) (i)         |  <p>IGNORE bond angles and positions of H and Cl relative to each other</p>                                                                                                                                 |        |              | 1         |
| (ii)            | <p><b>Any three from:</b></p> <p><b>M1</b> - (one bond in the) double bond breaks</p> <p><b>M2</b> - small molecules/monomers/chloroethene molecules join together</p> <p><b>M3</b> - to form a (long) chain/macromolecule</p> <p><b>M4</b> - product/polymer contains only single bonds</p> |        |              | 3         |
|                 |                                                                                                                                                                                                                                                                                              |        | <b>Total</b> | <b>11</b> |

| Question number | Answer                                                                                                               | Accept                                                                                                                              | Reject | Marks               |
|-----------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------|
| 7 (a) (i)       | <b>M1</b> - $\frac{144}{24\,000}$<br><b>M2</b> - 0.006                                                               | One mark for $(144 \div 24) = 6$                                                                                                    |        | 1                   |
| (ii)            | 0.006                                                                                                                |                                                                                                                                     |        | 1                   |
| (iii)           | <b>M1</b> - $\frac{0.888}{0.006}$<br><b>M2</b> - 148 ( <u>MUST</u> be a whole number)                                |                                                                                                                                     |        | 1                   |
| (iv)            | <b>M1</b> - $(\text{CO}_3) = 60$<br><b>M2</b> - 88<br><b>M3</b> - Sr / strontium<br><br>Mark csq throughout part (a) | answer csq on correctly calculated value of <b>M2</b> (i.e. metal closest to calculated $A_r$ ), but <u>must</u> be a Group 2 metal |        | 1<br><br>1<br><br>1 |

| Question Number | Answer                                                                                                                                                                                                                                                                                                                                                                      | Accept | Reject       | Marks     |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------|-----------|
| 7 (b)           | <p>Any <b>two</b> from:</p> <p><b>M1</b> - gas was lost between adding acid and replacing bung</p> <p><b>M2</b> - bung does not fit/there are leaks in the apparatus</p> <p><b>M3</b> - some gas dissolved/reacted in the water</p> <p><b>M4</b> - the carbonate was impure</p> <p><b>M5</b> - the temperature (of the gas) was <u>lower</u> than room temperature/25°C</p> |        |              | 2         |
|                 |                                                                                                                                                                                                                                                                                                                                                                             |        | <b>Total</b> | <b>10</b> |

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