# 2014 Chemistry

# Intermediate 1

# Finalised Marking Instructions

**Part One: General Marking Principles for Chemistry Intermediate 1**

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

**(a)** Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.

**(b)** Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

**GENERAL MARKING ADVICE: Chemistry Intermediate 1**

The marking schemes are written to assist in determining the "minimal acceptable answer" rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates' evidence, and apply to marking both end of unit assessments and course assessments.

***General information for markers***

The general comments given below should be considered during all marking. It should be noted that these are general marking principles and may be superseded by decisions made at the Markers' Meeting.

1. Markers are reminded to read candidate responses **in their entirety**. If the candidate shows a clear understanding of the chemistry but does not use the exact words of the Marking Instructions they should still be given credit.

2. Markers are reminded that **no** comments are to be written on scripts. Comments such as 'ARITH', 'ERROR' and 'BOD' (Benefit of doubt) are **not** acceptable.

3. A guiding principle in marking is to give credit for (partially) correct chemistry rather than to look for reasons not to give marks.

   **Example:** A student measured the pH of four carboxylic acids to find out how the strength is related to the number of chlorine atoms in the molecule. The results are shown.

| Structural Formula | pH |
|---|---|
| $CH_3COOH$ | 1·65 |
| $CH_2ClCOOH$ | 1·27 |
| $CHCl_2COOH$ | 0·90 |
| $CCl_3COOH$ | 0·51 |

   How is the strength of the acids related to the number of chlorine atoms in the molecule?

   Although not completely correct, an answer such as "the more $Cl_2$, the stronger the acid" should gain the full mark.

4. Marks should **not** be deducted for incorrect spelling or loose language as long as the meaning of the word(s) is conveyed.

   **Example:** Answers like “hydrolic acid” (for “hydrochloric acid”) and “it gets hotter” (for “the temperature rises”) should be accepted.

   However the example below would not be acceptable, as an incorrect chemical term, which the candidate should know, has been given.

   **Example:** If the correct answer is “polyethene”, and the candidate’s answer is “polyethane”, this should not be accepted.

5. A right answer followed by a wrong answer should be treated as a cancelling error and no marks should be given.

   **Example:** What is the colour of universal indicator in acid solution?

   The answer “red, blue” gains no marks.

6. If a right answer is followed by additional information which does not conflict, the additional information should be ignored, whether correct or not. However, if selecting information from the Data Booklet is required, the information selected must be relevant and correct, as this would negate.

7. Full marks should be awarded for the correct answer to a calculation on its own; the part marks shown in the Marking Instructions are for use when working is given.

8. A half mark should be deducted in a calculation for each arithmetic slip.

9. A half mark should be deducted for incorrect or missing units **only when stated in the Marking Instructions.**

10. A half mark should be deducted for transcription errors.

11. Where a wrong numerical answer (already penalised) is carried forward to another step, no further penalty is incurred provided the end result is used correctly.

12. A symbol or correct formula should be accepted in place of a name **unless stated otherwise in the Marking Instructions.**

13. If an answer comes directly from the text of the question, no marks should be given.

    **Example:** Propane burns to give out energy.

    Name the type of chemical reaction taking place.

    No marks should be given for “burning” since the word “burns” appears in the text.

14. Unless the question is clearly about a non-chemistry issue, eg costs in industrial chemistry, a non-chemical answer gains no marks.

    **Example:** Why does the (catalytic) converter have a honeycomb structure?

    A response such as “to make it work” may be correct but it is not a chemical answer and the mark should not be given.

15. When it is very difficult to make a decision about a partially correct answer, a half mark can be awarded.

16. When marks have been totalled, a half mark should be rounded up.

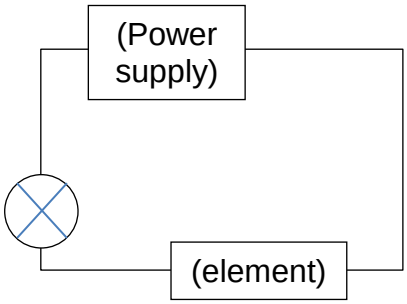
**Part Two: Marking Instructions for each Question**

**Section A**

| Question | Expected Answer(s) |
|---|---|
| 1 | D |
| 2 | A |
| 3 | D |
| 4 | C |
| 5 | D |
| 6 | B |
| 7 | A |
| 8 | B |
| 9 | C |
| 10 | D |
| 11 | C |
| 12 | D |
| 13 | A |
| 14 | A |
| 15 | A |
| 16 | D |
| 17 | A |
| 18 | C |
| 19 | C |
| 20 | C |

**Section B**

| Question | | | Expected Answer(s) | Max Mark | ½ mark | Unacceptable |
|---|---|---|---|---|---|---|
| **1** | **a** | | Sb | **1** | SB /<br>sb /<br>sB | |
| **1** | **b** | **i** | Can be reshaped on heating<br><br>Must have both reshaping and heat/melt | | Will melt /<br>Soften on heating | Can be reshaped<br>Can be softened |
| **1** | **b** | **ii** | Fibres | | | |
| **2** | **a** | | Water temp label and scale ½<br>$^{o}$C units ½<br>plotting points ½<br>joining the points ½<br><br>allow 1 plotting error<br>allow ½ box tolerance on plotting<br><br>if plot at 0/0 then take as plotting error<br>if bar and line graph – ignore bar and mark line<br><br>Bar graph max 1 mark for label and units | **2** | | |
| **2** | **b** | | 325<br><br>Accept half box tolerance 320-330 | **1** | | |
| **2** | **c** | | Circled<br>Polymers and amino acids<br><br>½ mark each | **1** | | |

<table>
<tr><th colspan="3">Question</th><th>Expected Answer(s)</th><th>Max Mark</th><th>½ mark</th><th>Unacceptable</th></tr>
<tr><td>3</td><td>a</td><td></td><td>Car engines /<br>Spark plugs /<br>(thunder and ) Lightning storms</td><td>1</td><td></td><td>Cars<br>Lighters<br>Atmosphere<br>Acid rain<br>Light bulb</td></tr>
<tr><td>3</td><td>b</td><td></td><td>Sulphur dioxide / $SO_2$<br>Carbon dioxide / $CO_2$</td><td>1</td><td></td><td>Methane<br>Carbon monoxide</td></tr>
<tr><td>3</td><td>c</td><td></td><td>0 to 7 not inclusive of 7<br>Below 7</td><td>1</td><td></td><td>7 to 14</td></tr>
<tr><td>3</td><td>d</td><td></td><td>Carbon dioxide / $CO_2$</td><td>1</td><td></td><td>Carbon monoxide</td></tr>
<tr><td>4</td><td>a</td><td></td><td>110</td><td>1</td><td></td><td></td></tr>
<tr><td>4</td><td>b</td><td></td><td><table><tr><td>Property</td><td>Yes or No</td></tr><tr><td>Conducts electricity</td><td>Yes ½ mark</td></tr><tr><td>Conducts heat</td><td>Yes ½ mark</td></tr></table></td><td>1</td><td></td><td></td></tr>
<tr><td>4</td><td>c</td><td></td><td> 

All correct<br><br>Ignore more than 1 power supply or more than 1 element</td><td></td><td></td><td></td></tr>
</table>

| Question | | | Expected Answer(s) | Max Mark | ½ mark | Unacceptable |
|---|---|---|---|---|---|---|
| **5** | **a** | | Rusting<br>oxidation | **1** | | |
| **5** | **b** | | Salt present /<br>Ions present | **1** | | Sea water |
| **5** | **c** | | Zinc is more reactive than iron /<br>Zinc gives its electrons to iron /<br>Zinc sacrificially protects iron | **1** | | Quite reactive |
| **6** | **a** | | Mineral 1 – quartz<br>Mineral 2 – magnetite<br>Mineral 3 – cassiterite<br><br>Can use numbers instead of mineral names<br><br>All correct for 1 mark | **1** | | |
| **6** | **b** | | Tin oxide + carbon → tin + carbon dioxide<br><br>All correct for 1 mark<br>Accept formulae | **1** | | |
| **6** | **c** | | Corrosion resistant<br>Doesn't rust<br>Woudn't corrode | **1** | | Corrosion resistant + anything else |
| **7** | **a** | | Any environmental or sensible reason<br>Kills wildlife /<br>Kills fish /<br>Kills birds /<br>Damages our health<br>Causes pollution/<br>Damages environment/<br>Harmful/ bad for environment | **1** | | Causes a fire<br>Increases global warming<br>Affects marine life<br>(not cancelling) |
| **7** | **b** | | Dissolves in both oil and water /<br>Head dissolves in water and tail dissolves in oil | **1** | Dissolves in oil /<br>Dissolves in water | Breaking up<br>Mixed up<br>Reacts with oil |

| Question | | | Expected Answer(s) | Max Mark | ½ mark | Unacceptable |
|---|---|---|---|---|---|---|
| **8** | **a** | | Any environmental or resource reason<br>Damages wildlife /<br>Litter /<br>Saves resources /<br>Saves crude oil /<br>(Oil) is finite /<br>(Oil) will run out/<br>Long time to break down/<br>Non-biodegradable/<br>Finite resource/<br>Reused and causes less harm/<br>Reduce land fills<br><br>Looking for how/why | **1** | | Stops pollution<br>Bad for environment<br>Reduce greenhouse gases<br>Reused<br>Wastes money |
| **8** | **b** | | Ethene | **1** | | |
| **8** | **c** | | Poisonous gases given off /<br>Toxic gases given off /<br>Carbon monoxide given off /<br>Carbon given off /<br>Soot given off /<br>Carbon dioxide made/<br>Greenhouse gases/<br>Global warming | **1** | | Bad gases/ Smells<br>Heat given off<br>Air pollution<br>It is toxic |
| **9** | **a** | | Artificial /<br>Synthetic/<br>Man-made | **1** | | |
| **9** | **b** | | Nitrogen / N / $N_2$<br>Potassium / K<br>Phosphorus / P<br><br>Accept loose spelling<br>Accept recognisable formula | **1** | | Phosphate<br>Nitrate<br><br>+ incorrect element cancels |
| **9** | **c** | | Pesticides | **1** | | insecticide |
| **9** | **d** | | Circle strong then weak<br><br>Both correct for 1 mark | **1** | | |

| Question | | | Expected Answer(s) | Max Mark | ½ mark | Unacceptable |
|---|---|---|---|---|---|---|
| **10** | **a** | | Fermentation/<br>Anaerobic respiration | **1** | | |
| **10** | **b** | | Speed up the reaction/<br>Faster reaction | **1** | | |
| **10** | **c** | **i** | 38 | **1** | | |
| **10** | **c** | **ii** | Enzyme stops working / doesn't work as well<br>Enzyme denatured /<br>Enzyme destroyed<br>Yeast stops working /<br>Yeast denatured<br>Yeast destroyed<br>Yeast is killed | **1** | | |
| **11** | **a** | | Margarine **A** | **1** | | |
| **11** | **b** | | Test :<br>(Filter) paper test **½ mark**<br>Result:<br>greasy mark/<br>Moist mark/<br>Transparent<br>Translucent/<br>See through<br>Stain paper **½ mark** | **1** | | pH paper<br>clothes<br>fats and oils<br>stick to paper |
| **12** | **a** | | Blue to orange / yellow / brown / red / green<br><br>Both starting and final colour for 1 mark | **1** | | Blue to blue<br>Blue to black<br>Blue to blue/black<br>Blue to dark blue |
| **12** | **b** | | Caffeine | **1** | | |
| **12** | **c** | | $\frac{200}{2000}\times 100$ ½ mark<br><br>=10% ½ mark | **1** | $\frac{200}{2000}\times 100$ only<br><br>Arithmetic mistake | |

| Question | | | Expected Answer(s) | Max Mark | ½ mark | Unacceptable |
|---|---|---|---|---|---|---|
| **13** | **a** | | Have the same volume of water / There is different volumes of water/ Add 10cm$^3$ of water to test-tube B | **1** | Amount of water Add more water to test-tube A | Mass of water |
| **13** | **b** | | Starting and final temperature/ Temperature difference | | Temperature | Heat energy |

[END OF MARKING INSTRUCTIONS]