# GCSE Chemistry

# How to answer 6 mark LOR – J258-04 2018

# Example: J258 04 June 18, Q7a

### Task 1: Read this question

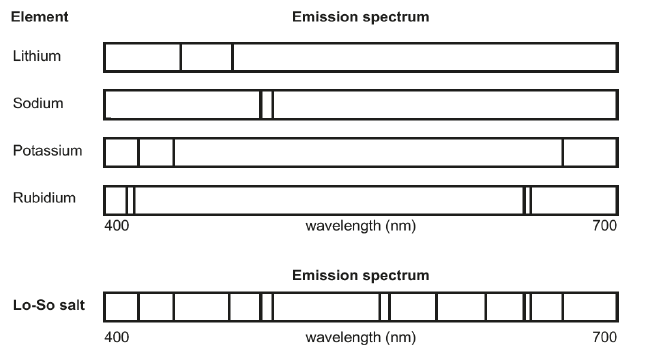
**7.** A new type of salt for using food is called ‘Lo-So salt’.

Nina wants to find out what elements ‘Lo-Salt salt’ contains.

She does some experiments to find the emission spectra of some compounds of Group 1 elements. She also does an experiment to find the emission spectrum of ‘Lo-Salt salt’.

She puts small samples of each element and the salt in a spectroscopy machine and looks at the print-out of results.

Here are Nina’s results.



#### Nina says that she thinks she needs to do further experiments to identify all the elements in ‘Lo-So salt’.

State which elements ‘Lo-So salt’ does and does not contain, giving your reasons, and describe what further experiments Nina needs to do to identify all the elements in ‘Lo-So salt’.

#### Read the part of the question that tells you what to do….

‘State which elements ‘Lo-So salt’ does and does not contain, giving your reasons, and describe what further experiments Nina needs to do to identify all the elements in ‘Lo-So salt’.’

Underline parts of the question that you need to include when you write your answer.

### Task 2: What levels are these answers?

Look again at the question. The ‘important things to do’ have been underlined:

**State which elements** ‘Lo-So salt’ does and does not contain, **giving your reasons**, and **describe what further experiments** Nina needs to do to identify all the elements in ‘Lo-So salt’.

A ‘good’ answer (a **Level 3 answer**) will answer ALL parts of the question so will ….

* Identify which elements are and are not present
* Give reasons for the identification of elements using the information given
* Describe the further experiments needed (at least one)

Answers at **level 2 and level 1** will only answer some parts of the question.

#### Look at these five examples of candidate answers

In your group, decide whether you think each answer is a ‘level 1’ or a ‘level 2’ or a ‘level 3’ answer. You don’t need a mark scheme to do this, just use your judgement, based on what the question is asking.

Justify your decisions by…

* Underlining parts of the answers that you ‘like’ and work out which part of the question the answer links to.
* Making notes on the answer to say what you think is ‘missing’.

**Answer 1**

State which elements ‘Lo-So salt’ does and does not contain, giving your reasons, and describe what further experiments Nina needs to do to identify all the elements in ‘Lo-So salt’

Lo-So salt contains Potassium and Sodium. This is because all the stationary phase lines match with the lines of the Lo-So salt. However, Lithium and Rubidium are not in the Lo-So salt because not all the stationary line s are not in the salt. Nina needs to do further experiments using the spectroscopy machine but with different elements. This is because not all the stationary lines were matched. This means that Lo-So salt is combined of more than Sodium and Potassium

**Level**

**Notes**

**Answer 2**

*‘*Lo-So salt’ appears to contain sodium and potassium as within it’s emission spectrum it seems tohave sodium’s and potassium’s too. It doesn’t contain litium or Rubidium as not all of their emission spectrum appear with ‘Lo-so salt’s. To test for other metals Nina could perform flame tests which will produce a coloured flame which can be used to identify metals. She could also test cations by using dilute acid so they form coloured precipitates she can identify. Nina could test for halide ions using silver nitrate solution or sulfate ions using barium chloride.

**Notes**

**Answer 3**

**Level**

Lo-So Salt contain Lithium, Sodium and Potassium. But it does not contain Rubidium. This is because the lines of the print-out results look exactly the same of element Lithium, Sodium and Potassium than lines in Rubidium. These three elements matches the same as the Lo-So Salt. Nina could repeat the experiment again but by adding some more samples to see if all the elements can identify in Lo-So Salt.

**Level**

**Notes**

**Answer 4**

‘Lo-so salt’ has the elements Potassium, lithium and sodium. This can be seen because it’s emission spectrum has the same wavelengths that these elements’ emission spectrum shows.

**Level**

**Notes**

**Answer 5**

Lo-So salt consists of small amounts of Potassium and rubidium. However the salt has low amounts of lithium as the Lo-So salt has a wavelength of 450nm. The emission spectrum shows 550nm which is more elements than Lithium. In order to carry out the experiments further, Nina needs to see which the acts more vigourously with the prescence of water and other aqeous solutions in order to see and identify all the elements in the Lo-So salt.

**Notes**

### Task 3: Writing your own answer

**Level**

Now write your own answer to the question on this sheet.

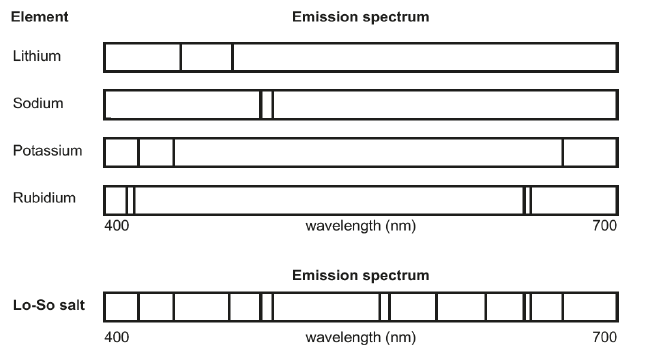
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Here are Nina’s results.



#### Nina says that she thinks she needs to do further experiments to identify all the elements in ‘Lo-So salt’.

State which elements ‘Lo-So salt’ does and does not contain, giving your reasons, and describe what further experiments Nina needs to do to identify all the elements in ‘Lo-So salt’.

### Task 4: How did the examiners mark these answers?

This is the mark scheme for the question that the examiners used to mark the question.

| **Question** | | | **Answer** | **Marks** | **Guidance** |
| --- | --- | --- | --- | --- | --- |
| **7** | **(a)** |  | **Level 3 (5–6 marks)**  Identifies element(s) present and not present, explains reasons and describes further experiments  *There is a well-developed line of reasoning which is clear and logically structured. The information presented is relevant and substantiated.*  **Level 2 (3–4 marks)**  Identifies element(s) present and not present, and explains reasons  *There is a line of reasoning presented with some structure. The information presented is relevant and supported by some evidence.*  **Level 1 (1–2 marks)**  Identifies element(s) present and not present.  *There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.*  **0 marks**  *No response or no response worthy of credit.* | 6 | **AO3.2b Analyses information and ideas to draw conclusions and identify elements in salt**   * Present: sodium, potassium and unknown(s) • Not present: lithium, rubidium   **IGNORE** elements incorrectly identified as present or not present at L1 and L2 only  **AO3.2b Analyses information and ideas to draw conclusions and explains how they identified elements in salt**   * For elements present lines are in same pattern / position / spectra ‘match’ or ‘fit’. * Absent elements there is no match/(only) partial match. * Unknown elements: some lines do not match elements given   **AO3.3a Analyses information and ideas to make judgements to describe what further experiments are needed**   * Need to find spectra for other elements * Need to match new spectra to spectrum of salt idea * Add sodium hydroxide to test for metal cations / add silver nitrate to test for chlorides / add barium salt to test for sulfate / add acid to test for carbonate / ion chromatography   **IGNORE** elements incorrectly identified as present or not present at L1 and L2 only |

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This is some information about the marks that the examiners gave for each answer.

|  |  |  |  |
| --- | --- | --- | --- |
| **Answer** | **Level** | **Mark** | **Comments** |
| 1 | **3** | 6 | This answer fully addresses both parts of the question. Although not a ‘perfect’ answer, (more explanation about how to compare the unknown lines with known spectra could have been added) notice how succinctly and clearly the candidate has addressed the points. |
| 2 | **3** | 5 | The answer fully identifies, with reasons, which elements are and are not present in the mixture. The original question intention was that candidates would suggest comparing the ‘unknown lines’ on the spectrum of Lo-salt with other reference spectra for known elements. However, many candidates suggested instead doing chemical tests (as this candidate has done) and these were accepted as correct. However, this candidate has made an error in suggesting that precipitation reactions should use hydrochloric acid (rather than dilute sodium hydroxide). Although further points are correct, this error leads to a mark of 5 rather than 6. |
| 3 | **2** | 3 | This candidate has achieved a Level 2 by identifying elements present and explaining reasons in terms of the matching spectra. However, some of the elements identified are incorrect (lithium is not present). This makes it difficult for the candidate to justify reasoning for the choices made and limits the mark to 3 rather than 4. |
| 4 | **1** | 1 | This answer only answers one part of the question (elements present). No elements are identified as absent and no further experiments are described. Also notice the error in identifying lithium as present. However, two elements are correctly identified. This is not a secure match to the Level 1 description; 1 marks. |
| 5 | **1** | 1 | This answer is a Level 1 at (1) mark because the criteria for a ‘secure’ Level 1 are not fully met, but it was considered that the candidate had partially engaged with the science by correctly identifying that potassium is present. |

#### Task 4 – Look at the levels you gave for each answer

Did you agree with the examiner level? If not, look at the comments and work out why.

Now use the mark scheme to mark your own answer.



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