**2016**

**Chemistry Units 1 & 2**

**Lab Validation Quiz 1:**

**Flame tests and Calibration Curves**

Recommended time 30 minutes

Please do not turn the page until instructed to do so.

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| **Name:** | **Teacher:** |
|  |  |

All questions must be answered in this booklet and full working should be shown for all calculation questions.

**A data sheet** will be provided to you and must not be marked in any way.

**Introduction:**

Flame tests are a basic analytical technique that allows us to identify different ions by the colour of the flame that they produce when heated.

Calibration curves are used in many ways in analytical chemistry to produce quantitative data. Our focus was on their use in Atomic Absorption Spectroscopy (AAS).

1. In the table below list three safety hazards associated with conducting flame tests and the appropriate precautions that would minimise the risk to students.

|  |  |
| --- | --- |
| **Safety Hazard** | **Precaution** |
|  |  |
|  |  |
|  |  |

[3]

1. During the experiment observations of the different colours produced were recorded. Explain how the ions tested produced these colours. You must use a diagram as part of your explanation.

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[5]

1. We tested a range of ionic compounds including two sodium compounds (NaCl and NaNO3) and two potassium compounds (KNO3 and KCl). What pattern did you notice when you analysed these compounds?

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[1]

1. The Flame tests we did in class were used as an introduction to the ideas of Atomic Emission Spectroscopy and Atomic Absorption Spectroscopy. Give one real world, practical application of each analytical technique.

AES \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

AAS \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[2]

1. Explain why it is important to use a lamp that is made of the same element that is being tested for in Atomic Absorption Spectroscopy.

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[3]

1. Briefly outline the procedure for constructing a calibration curve (using bullet points).

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[3]

1. Explain the difference between qualitative and quantitative analysis.

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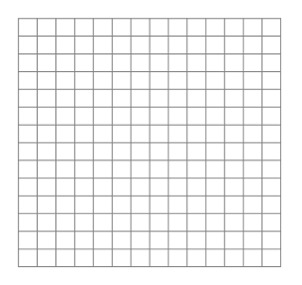
[2]

1. How does a colorimeter work?

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[3]

1. Draw a calibration curve using the data below (make sure to label the axes), and identify the concentration of an unknown sample with an absorbance of 4.35 AU.

[](http://www.google.com.au/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=&url=http://mathbits.com/MathBits/StudentResources/GraphPaper/GraphPaper.htm&psig=AFQjCNFlB6_7qhNrXESN0DQzao6MO-TiEA&ust=1455258044517678)

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Calibration data** | |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| Concentration of standards  (ppm) | Absorbance | |  | | --- | |  | |  |  |  |  |  |
| **0.1** | **1.5400** |  |  |  |  |  |  |
| **0.2** | **2.0300** |  |  |  |  |  |  |
| **0.3** | **3.1700** |  |  |  |  |  |  |
| **0.4** | **3.6700** |  |  |  |  |  |  |
| **0.5** | **4.8900** |  |  |  |  |  |  |
| **0.6** | **6.7300** |  |  |  |  |  |  |
| **0.7** | **6.7400** |  |  |  |  |  |  |
| **0.8** | **7.8700** |  |  |  |  |  |  |
| **0.9** | **8.8600** |  |  |  |  |  |  |
| **1.0** | **10.350** |  |  |  |  |  |  |

[3]