

Instrumental Analysis

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Give three advantages of instrumental methods compared with chemical tests. (3 marks)

Step 1 · Accuracy

They are accurate.

Step 2 · Sensitivity

They are sensitive: they can detect very small amounts.

Step 3 · Speed

They are rapid, and can be automated and used on small samples.

Answer: Accurate, sensitive, rapid

Check: Any three valid points.

2. Now try one with the steps

Describe how flame emission spectroscopy identifies metal ions. (3 marks)

Step 1 · Flame

Step 2 · Spectroscope

Step 3 · Identify

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Give three advantages of instrumental methods of analysis. [3]

2. State what flame emission spectroscopy is used to identify. [1]

3. Describe how the light from the flame is analysed in flame emission spectroscopy. [2]
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4. Explain why a line spectrum can identify a metal ion. [1]
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5. Give one advantage of flame emission spectroscopy over a simple flame test. [1]
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6. A spectrum has a line at 589 nm only. Using the reference spectra, identify the metal ion. [1]
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7. Sample 2 has lines at 404, 510, 515, 522 and 766 nm. Identify the two metal ions. [2]
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8. From the calibration data, state the concentration in mg/dm^3 that gives an intensity of 50. [1]
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9. From the calibration data, state the concentration in mg/dm^3 that gives an intensity of 30. [1]
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10. Explain why solutions of known concentration are measured first. [1]
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11. Explain why simple flame tests are less useful than spectroscopy for very low concentrations. [1]
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12. Give one disadvantage of instrumental methods. [1]
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13. A sample was diluted 10 times and then gave a concentration of 5.0 mg/dm^3 . Calculate the concentration of the original sample in mg/dm^3 . [2]
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14. Explain why all of an element's reference lines must appear in the sample's spectrum before you conclude it is present. [2]

4. Before you hand it in

Matching a single line

All the lines in the reference must be present.

Forgetting the dilution factor

Multiply the calibrated concentration by the dilution factor.

"Instruments do not need any comparison data."

Spectra are compared with known spectra; concentrations need a calibration curve.