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GCSE Chemistry Topic 8 AQA: Chemical Analysis

Exam Questions/Mock Exam Questions

Questions For Foundation, Higher, and Triple Science (scroll down for questions for higher and triple science only):
(It would still be recommended to answer the foundation tier questions for triple science and higher tier to ensure you have good understanding).

Q1.
Jack learns the definition of a pure substance.

State what is meant by a pure substance in chemistry.

_____

[1]

Q2.
Harry looks at melting points.

(a) State one way you can use melting point data to tell if a substance is pure.

_____

[1]

(b) Explain how impurities affect the melting point of a substance.

_____

_____

[2]

[Total: 3 marks]

Q3.
Ben is revising formulations.

(a) State what a formulation is.

_____

[1]

(b) Give one everyday example of a formulation.

_____

[1]

[Total: 2 marks]

Q4.
Daniel studies chromatography.

(a) State one use of chromatography.

---

[1]

(b) Explain why the start line in paper chromatography must be drawn in pencil.

---

[2]

[Total: 3 marks]

Q5.
Oliver sets up a chromatography experiment.

(a) State what the mobile phase is in paper chromatography.

---

[1]

(b) State what the stationary phase is.

---

[1]

[Total: 2 marks]

Q6.
Ethan calculates Rf values.

The solvent front moved 8.0 cm. A spot moved 4.0 cm.

(a) Calculate the Rf value.

[2]

(b) Give the formula used for Rf.

[1]

[Total: 3 marks]

Q7.
Sam looks at gas tests.

(a) State the test for hydrogen gas.

[1]

(b) State the test for oxygen gas.

[1]

(c) State the test for carbon dioxide gas.

[1]

[Total: 3 marks]

Q8.
Charlie investigates chlorine gas.

(a) Describe the test for chlorine gas.

[1]

(b) State the result of this test.

[1]

[Total: 2 marks]

Q9.
Noah studies flame tests.

(a) State the flame colour for lithium ions.

[1]

(b) State the flame colour for sodium ions.

[1]

(c) State the flame colour for potassium ions.

[1]

[Total: 3 marks]

Q10.
Jacob tests for calcium ions.

(a) State the flame colour for calcium ions.

[1]

(b) State the flame colour for copper ions.

[1]

[Total: 2 marks]

Q11.
William tests metal ions with sodium hydroxide solution.

State the colour of the precipitate formed with:

(a) copper(II) ions.

_____

[1]

(b) iron(II) ions.

_____

[1]

(c) iron(III) ions.

_____

[1]

[Total: 3 marks]

Q12.
Alex is testing for halide ions.

State the colour of the precipitate formed when silver nitrate solution is added to:

(a) chloride ions.

_____

[1]

(b) bromide ions.

_____

[1]

(c) iodide ions.

_____

[1]

[Total: 3 marks]

Q13.
Luke tests for sulfates.

Describe the test for sulfate ions and state the result.

[2]

[Total: 2 marks]

Q14.
James tests for carbonates.

Describe how to test for carbonate ions and state the result.

[2]

[Total: 2 marks]

Q15.
Tom is revising chemical analysis.

Explain why flame emission spectroscopy is more useful than flame tests for analysing metal ions.

[3]

[Total: 3 marks]

Higher Tier

Q16.
Jack learns about purity.

(a) Define a pure substance.

[2]

(b) Explain how boiling point data can be used to check purity.

[2]

[Total: 4 marks]

Q17.
Harry is studying formulations.

(a) State what a formulation is.

[1]

(b) Explain why formulations are useful.

[2]

[Total: 3 marks]

Q18.
Ben investigates chromatography.

Explain why different substances travel different distances on the chromatogram.

[3]

[Total: 3 marks]

Q19.
Daniel carries out paper chromatography.

(a) Give the equation used to calculate the Rf value.

[1]

(b) A spot moves 5.0 cm and the solvent front moves 10.0 cm.
Calculate the Rf value.

[2]

[Total: 3 marks]

Q20.
Oliver studies gas tests.

Describe the test for:

(a) hydrogen.

[1]

(b) oxygen.

[1]

(c) carbon dioxide.

---

[1]

(d) chlorine.

---

[1]

[Total: 4 marks]

Q21.
Ethan does flame tests.

State the flame colour for each ion:

(a) lithium.

---

[1]

(b) sodium.

---

[1]

(c) potassium.

---

[1]

(d) calcium.

---

[1]

(e) copper.

---

[1]

[Total: 5 marks]

Q22.
Sam tests metal ions with sodium hydroxide solution.

State the colour of the precipitate formed with:

(a) copper(II) ions.

_____

[1]

(b) iron(II) ions.

_____

[1]

(c) iron(III) ions.

_____

[1]

(d) aluminium ions.

_____

[1]

[Total: 4 marks]

Q23.
Charlie is testing for halide ions using silver nitrate solution.

State the colour of the precipitate formed with:

(a) chloride ions.

_____

[1]

(b) bromide ions.

_____

[1]

(c) iodide ions.

[1]

[Total: 3 marks]

Q24.
Noah tests for sulfates.

Describe how to test for sulfate ions and state the result.

[2]

[Total: 2 marks]

Q25.
Jacob tests for carbonates.

Describe how to test for carbonate ions and state the result.

[2]

[Total: 2 marks]

Q26.
William is comparing flame tests and flame emission spectroscopy.

(a) State one disadvantage of flame tests.

[1]

(b) Explain why flame emission spectroscopy is more accurate than flame tests.

[2]

[Total: 3 marks]

Q27.
Alex looks at the flame emission spectrum of a mixture.

(a) Explain how the spectrum shows that the sample contains more than one metal ion.

[2]

(b) Suggest one advantage of using a computer to analyse spectra.

[1]

[Total: 3 marks]

Q28.
Luke investigates mixtures.

(a) State the difference between a pure substance and a mixture.

[1]

(b) Suggest why medicines are formulated.

[2]

[Total: 3 marks]

Q29.
James is calculating Rf values.

The solvent front moved 12.0 cm. A spot moved 9.0 cm.

Calculate the Rf value.

[2]

[Total: 2 marks]

Q30.
Tom studies the test for chlorine.

Explain why damp blue litmus paper is used to test for chlorine gas.

[2]

[Total: 2 marks]

Q31.
Jack is revising precipitation reactions.

Explain why excess sodium hydroxide solution can help identify aluminium ions but not calcium ions.

[3]

[Total: 3 marks]

Q32.
Harry prepares a sample for flame emission spectroscopy.

State why the sample must be in solution.

[1]

[Total: 1 mark]

Q33.
Ben compares simple laboratory tests with instrumental methods.

Give two advantages of instrumental methods.

[2]

[Total: 2 marks]

Q34.
Daniel is given a sample that may contain sulfate and carbonate ions.

Explain how he can distinguish between them.

[3]

[Total: 3 marks]

Q35.
Oliver analyses a water sample.

(a) State two ions present in hard water.

[2]

(b) Suggest why hard water can be a problem in homes.

[2]

[Total: 4 marks]

Q36.
Ethan is testing water for purity.

State two tests he could carry out and explain what results he would expect for pure water.

[4]

[Total: 4 marks]

Q37.
Sam calculates concentration.

20 g of sodium chloride is dissolved in 500 cm^3 of water.

(a) Calculate the concentration in g/dm^3.

[2]

(b) State the equation used.

[1]

[Total: 3 marks]

Q38.
Charlie is looking at chromatography results.

Explain how chromatographic data can be compared with reference materials.

[2]

[Total: 2 marks]

Q39.
Noah thinks about errors in chromatography.

Suggest one reason why a substance might not separate properly in chromatography.

[1]

[Total: 1 mark]

Q40.
Jacob analyses results from flame emission spectroscopy.

Explain how this technique can identify metal ions and their concentration.

[3]

[Total: 3 marks]

TRIPLE SCIENCE

Q41.
William is studying instrumental methods.

Explain three reasons why instrumental methods are often preferred over traditional chemical tests.

[3]

Q42.
Alex looks at emission spectra.

Explain how the emission spectrum of an element is linked to the arrangement of electrons in its atoms.

[3]

Q43.
Luke analyses an unknown sample with flame emission spectroscopy.

The spectrum shows three different sets of lines.

What does this tell you about the sample?

[2]

Q44.
James compares flame emission spectroscopy with flame tests.

Discuss the advantages and disadvantages of both methods.

[4]

Q45.
Tom investigates water supplies.

(a) State one chemical test to show that water is pure.

[1]

(b) Explain how desalination can produce potable water from seawater.

[2]

[Total: 3 marks]

Q46.
Jack is analysing mixtures using chromatography.

(a) Explain why chromatography can be used to separate mixtures.

[2]

(b) Suggest how a mixture of colourless amino acids could be detected after chromatography.

[2]

[Total: 4 marks]

Q47.

Harry looks at instrumental analysis.

(a) Explain how computers make flame emission spectroscopy more reliable.

[2]

(b) State one other instrumental analytical technique used in chemistry.

[1]

[Total: 3 marks]

Q48.

Ben studies flame emission spectra.

A sample gives a bright line at a wavelength of 589 nm.

Explain what this shows about the ions present.

[2]

Q49.
Daniel wants to identify a mixture of sodium and potassium ions.

Explain how flame emission spectroscopy can identify both ions in the same sample.

[3]

Q50.
Oliver is testing ions.

Explain why both a carbonate test and a sulfate test should not be carried out on the same sample without removing carbonate ions first.

[2]

Q51.
Ethan reads about real-life applications of spectroscopy.

Give two examples of how flame emission spectroscopy is used outside the school laboratory.

[2]

Q52.
Sam is analysing a water sample that contains dissolved salts.

Explain how this could affect the results of flame emission spectroscopy.

[2]

Q53.
Charlie compares the resolution of flame emission spectroscopy with flame tests.

Explain what is meant by ‘resolution’ in this context.

[2]

Q54.
Noah is analysing an unknown metal ion solution.

The flame emission spectrum matches calcium but the lines are less intense.

Explain what this shows about the concentration of the solution.

[2]

Q55.
Jacob is preparing a sample for instrumental analysis.

Explain why using distilled water instead of tap water is important in flame emission spectroscopy.

[2]