GRADEUP

# AQA (GCSE Notes)

## Chapter 8: Chemical Analysis

**Q1.** What is meant by a pure substance in chemistry?

**Q2.** How can melting point data help identify whether a substance is pure?

**Q3.** Why do pure substances have specific boiling points?

**Q4.** What is the main difference between a pure substance and a mixture?

**Q5.** How does the melting point of a mixture compare with that of a pure substance?

**Q6.** Why does an impure substance melt over a range of temperatures?

**Q7.** What is the definition of a formulation?

**Q8.** Why are formulations used in everyday products?

**Q9.** How can the properties of a formulation be controlled?

**Q10.** Give an example of a formulation and explain its components' purposes.

**Q11.** How do formulations differ from simple mixtures?

**Q12.** Why is it important to mix the components of a formulation in the correct amounts?

**Q13.** What types of products are often made as formulations?

**Q14.** Why are medicines often formulated with more than one chemical?

**Q15.** How would you identify if a product is a formulation from its label?

**Q16.** Why might a paint formulation contain both pigments and solvents?

**Q17.** What role do fertilisers play as formulations in agriculture?

**Q18.** How can you test the purity of a chemical substance?

**Q19.** What would happen to the boiling point of a substance if it is contaminated?

**Q20.** In what way does the everyday definition of "pure" differ from the scientific definition?

**Q21.** Why might a pure substance from nature still be considered impure in chemistry?

**Q22.** How do alloys demonstrate the concept of formulations?

**Q23.** What is the role of chromatography in identifying pure substances?

**Q24.** Why are boiling point and melting point data useful in forensic science?

**Q25.** Why is it important for food products to be pure?

**Q26.** What makes a good cleaning agent formulation?

**Q27.** What property of a mixture changes if an extra component is added?

**Q28.** Why do scientists measure both melting and boiling points during purity testing?

**Q29.** How do temperature changes affect the properties of mixtures?

**Q30.** How does a drug formulation ensure that the medicine works effectively?

**Q31.** Why can formulations not be separated by simple physical means?

**Q32.** What is the importance of accurate measuring when making formulations?

**Q33.** How does the presence of impurities affect the safety of chemicals?

**Q34.** Why is it important that fuels are carefully formulated?

**Q35.** What is the function of binders in paint formulations?

**Q36.** Why do scientists analyse formulations in forensic investigations?

**Q37.** How do changes in component ratios affect the performance of a formulation?

**Q38.** Why is it important to test the consistency of formulations during manufacturing?

**Q39.** What makes instrumental methods more reliable than qualitative tests?

**Q40.** How can chromatography help identify unknown chemicals in a mixture?

**Q41.** Why is it difficult to identify the components of a complex mixture without instrumental methods?

**Q42.** What advantage do instrumental methods offer when only a small sample is available?

**Q43.** How do impurities affect the appearance of a substance during testing?

**Q44.** What is meant by the term “sensitive” in relation to instrumental testing?

**Q45.** Why must forensic scientists use accurate and sensitive tests?

**Q46.** How can you tell if a liquid is a formulation?

**Q47.** Why are insoluble solids formed during some purity tests?

**Q48.** Why do cleaning products often contain multiple components?

**Q49.** What would happen if the components in a formulation were not well mixed?

**Q50.** How can you use chromatography to check the purity of a sample?

**Q51.** What is the purpose of the stationary phase in paper chromatography?

**Q52.** What is the role of the mobile phase in paper chromatography?

**Q53.** Why do different substances move different distances in paper chromatography?

**Q54.** What is meant by the Rf value in chromatography?

**Q55.** How is the Rf value of a substance calculated?

**Q56.** What does an Rf value tell you about a substance in chromatography?

**Q57.** Why must the baseline in paper chromatography be drawn in pencil?

**Q58.** What would happen if the baseline in chromatography was drawn in ink?

**Q59.** What does it mean if a chromatogram shows more than one spot for a substance?

**Q60.** How can you tell if a substance is pure using chromatography?

**Q61.** What does a single spot on a chromatogram suggest about a substance?

**Q62.** Why is it important to keep the solvent level below the baseline in chromatography?

**Q63.** Why do different solvents produce different chromatograms for the same mixture?

**Q64.** What safety precautions should be taken during the chromatography experiment?

**Q65.** How do you prepare a chromatography paper for separating food colours?

**Q66.** What is the significance of placing the lid on the chromatography container?

**Q67.** What can you do if two substances have very similar Rf values?

**Q68.** What is the effect of temperature on the movement of substances in chromatography?

**Q69.** Why is it important to allow the solvent to rise to a suitable height on the paper?

**Q70.** How can paper chromatography be used to identify an unknown substance?

**Q71.** In a chromatography experiment, what would you do if the solvent front is not straight?

**Q72.** How do impurities in a sample affect the chromatography results?

**Q73.** What are some common solvents used in paper chromatography?

**Q74.** How can you compare Rf values obtained in an experiment with known values?

**Q75.** How would you measure the distance moved by the solvent?

**Q76.** How would you measure the distance moved by a coloured spot?

**Q77.** What units are used when calculating Rf values?

**Q78.** What is the maximum value an Rf value can have?

**Q79.** Why should Rf values be recorded to two decimal places?

**Q80.** What is the test for hydrogen gas?

**Q81.** What observation confirms the presence of hydrogen during the test?

**Q82.** Why is a burning splint used when testing for hydrogen?

**Q83.** What is the test for oxygen gas?

**Q84.** What does it mean when a glowing splint relights?

**Q85.** Why is it important to use a glowing splint instead of a burning one when testing for oxygen?

**Q86.** Why must the test tube be open during the test for gases?

**Q87.** What might cause a false positive result when testing for hydrogen?

**Q88.** How can you make sure the gas being tested is not contaminated?

**Q89.** Why is it useful to test for gases in chemical reactions?

**Q90.** How do you safely collect hydrogen gas in the lab?

**Q91.** Why is hydrogen collected over water?

**Q92.** What safety concerns are there when testing for hydrogen?

**Q93.** Why does hydrogen make a 'pop' sound when tested?

**Q94.** In what type of reaction is oxygen usually produced?

**Q95.** How can you distinguish between hydrogen and oxygen using tests?

**Q96.** What would happen if you used a glowing splint to test for hydrogen?

**Q97.** How could you show that a gas produced is not oxygen?

**Q98.** Why should you carry out the gas tests quickly after collecting the gas?

**Q99.** What is the advantage of using simple gas tests in school laboratories?

**Q100.** How can you confirm that a gas collected in an experiment is not air?

**Q101.** What is the name of the solution used to test for carbon dioxide?

**Q102.** Describe what happens to limewater when carbon dioxide is bubbled through it.

**Q103.** Why does limewater turn cloudy when carbon dioxide is present?

**Q104.** What gas turns damp litmus paper white?

**Q105.** What is the reason for dampening the litmus paper when testing for chlorine?

**Q106.** How does chlorine affect litmus paper?

**Q107.** What colour does lithium produce in a flame test?

**Q108.** What colour does sodium produce in a flame test?

**Q109.** What flame colour is observed for potassium compounds?

**Q110.** What flame colour is produced by calcium ions?

**Q111.** What is the flame colour for copper compounds?

**Q112.** Why might some flame colours be difficult to see in a sample with mixed ions?

**Q113.** What is the purpose of a flame test?

**Q114.** Why is it important to clean the wire loop before performing a flame test?

**Q115.** Name two metal ions that give a white precipitate when sodium hydroxide is added.

**Q116.** Which white precipitate dissolves in excess sodium hydroxide?

**Q117.** How would you distinguish between calcium and aluminium ions using sodium hydroxide?

**Q118.** What colour precipitate is formed when copper(II) ions react with sodium hydroxide?

**Q119.** What colour precipitate does iron(II) form with sodium hydroxide?

**Q120.** What colour precipitate does iron(III) form with sodium hydroxide?

**Q121.** How could you distinguish between iron(II) and iron(III) using sodium hydroxide?

**Q122.** What is the name of the solid formed when a metal ion reacts with sodium hydroxide?

**Q123.** Write a word equation for the reaction of copper(II) sulfate with sodium hydroxide.

**Q124.** Write a balanced symbol equation for the reaction of iron(II) sulfate with sodium hydroxide.

**Q125.** Write a balanced chemical equation for the reaction of aluminium nitrate with sodium hydroxide.

**Q126.** What is a precipitate?

**Q127.** What does it mean if a precipitate dissolves in excess sodium hydroxide?

**Q128.** How can you test whether a white precipitate is aluminium hydroxide?

**Q129.** What is the appearance of magnesium hydroxide when formed in a reaction?

**Q130.** How can you distinguish between magnesium and calcium ions using flame tests?

**Q131.** Why is it useful to use both flame tests and sodium hydroxide tests when identifying metal ions?

**Q132.** What safety precautions should be taken when using chlorine gas in a test?

**Q133.** What should be done if no flame colour is seen in a flame test?

**Q134.** Why must the wire used in a flame test be platinum or nichrome?

**Q135.** Describe how to carry out a flame test.

**Q136.** What would you observe if you added sodium hydroxide to a solution containing iron(III) ions?

**Q137.** How does the test for chlorine differ from the test for carbon dioxide?

**Q138.** Why can some metal hydroxides not be identified by colour alone?

**Q139.** What ion causes limewater to turn milky?

**Q140.** What gas is formed when calcium carbonate reacts with an acid?

**Q141.** Why is calcium hydroxide described as a test reagent?

**Q142.** What happens to litmus paper in the presence of an acidic gas like chlorine?

**Q143.** Why must the litmus paper be damp when testing for chlorine?

**Q144.** How would you test a solution for the presence of copper(II) ions?

**Q145.** What ion gives a green precipitate with sodium hydroxide?

**Q146.** Explain why flame colours are not reliable for samples with more than one metal ion.

**Q147.** What is the role of sodium hydroxide in ion identification?

**Q148.** Why is it important to use clean apparatus when testing for metal ions?

**Q149.** What would you expect to see when sodium hydroxide is added to magnesium chloride?

**Q150.** Suggest how a student could confirm that a white precipitate is not calcium hydroxide.

**Q151.** What gas is produced when a carbonate reacts with a dilute acid?

**Q152.** How can you test for the presence of carbon dioxide?

**Q153.** What happens to limewater when carbon dioxide is bubbled through it?

**Q154.** Which ion is tested using silver nitrate solution and dilute nitric acid?

**Q155.** What colour precipitate is formed when silver nitrate reacts with chloride ions?

**Q156.** What is the colour of the precipitate when silver nitrate reacts with bromide ions?

**Q157.** Which halide forms a yellow precipitate when tested with silver nitrate?

**Q158.** Why is dilute nitric acid added before silver nitrate in the halide test?

**Q159.** What is the purpose of adding dilute hydrochloric acid before testing for sulfate ions?

**Q160.** What colour precipitate indicates the presence of sulfate ions?

**Q161.** Which chemical is used with hydrochloric acid to test for sulfate ions?

**Q162.** What do all the halide ion tests have in common?

**Q163.** Why is it important to carry out ion tests in a specific order?

**Q164.** Why must a flame test be done before precipitation tests?

**Q165.** What is the general term for tests used to identify ions in a solution?

**Q166.** What is one limitation of using chemical tests to identify ions?

**Q167.** What is meant by the term 'instrumental method' in chemical analysis?

**Q168.** Give one advantage of instrumental methods over chemical tests.

**Q169.** Why are instrumental methods considered more accurate than chemical tests?

**Q170.** Why are instrumental methods faster than traditional chemical tests?

**Q171.** What is meant by sensitivity in the context of instrumental methods?

**Q172.** What is flame emission spectroscopy used for?

**Q173.** What is the role of the spectroscope in flame emission spectroscopy?

**Q174.** What does a line spectrum show?

**Q175.** How can a line spectrum help identify a metal ion?

**Q176.** How can the concentration of a metal ion be determined using flame emission spectroscopy?

**Q177.** What must be done to compare a sample spectrum to identify the metal ion?

**Q178.** Why is flame emission spectroscopy more useful than a flame test?

**Q179.** In what form must the sample be for flame emission spectroscopy?

**Q180.** What happens to the sample in the flame during flame emission spectroscopy?

**Q181.** How does the colour of the flame relate to the metal ion present?

**Q182.** What information is needed to interpret a line spectrum?

**Q183.** What does each line on the spectrum represent?

**Q184.** What is the advantage of using a reference spectrum when analysing results?

**Q185.** Which ion tests can be done using only one solution?

**Q186.** What result confirms the presence of iodide ions in a solution?

**Q187.** What precautions should be taken when using silver nitrate?

**Q188.** How can you tell if a compound contains sulfate ions?

**Q189.** What is observed if no sulfate ions are present in a test?

**Q190.** Why is hydrochloric acid used instead of nitric acid in the sulfate test?

**Q191.** What is a positive result in the carbonate test?

**Q192.** What would happen if you used hydrochloric acid with silver nitrate?

**Q193.** Why should flame tests be carried out with a clean wire?

**Q194.** How can you clean a wire loop for a flame test?

**Q195.** Which test could help identify a white precipitate of silver halide?

**Q196.** What is the colour difference between silver chloride and silver iodide?

**Q197.** Why is a reference chart needed in flame emission spectroscopy?

**Q198.** What might cause an incorrect reading in a flame emission spectroscopy test?

**Q199.** How can two different metal ions be distinguished using spectroscopy?

**Q200.** Why is it important to test for both anions and cations in an unknown compound?