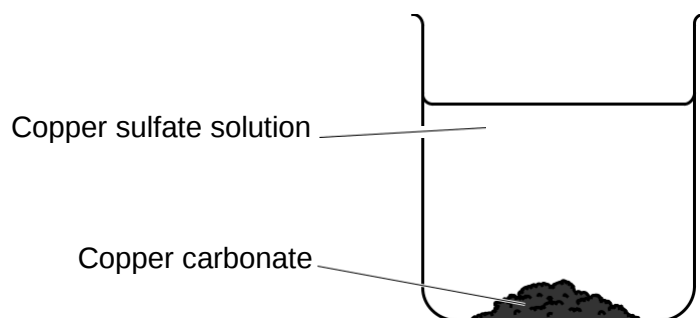


- 4 A student makes some blue crystals of copper sulfate. They add copper carbonate to sulfuric acid in a beaker until there is unreacted solid at the bottom of the container.



- (a) Why does the student add copper carbonate until there is unreacted solid?

Tick (✓) **one** box.

So that all the acid is used up.

☐

So that all the carbonate is used up.

☐

So that no product is left in the solution.

☐

So the solid is the main product.

☐

[1]

- (b) How can the student speed up the reaction?

Tick (✓) **two** boxes.

Add water to the beaker.

☐

Heat the solution in the beaker.

☐

Use a bigger volume of acid.

☐

Use a more concentrated acid.

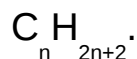
☐

Use bigger pieces of copper carbonate.

☐

[2]

(c) The hydrocarbons in crude oil are mostly alkanes. Alkanes all have the general formula:



Larger hydrocarbon molecules are broken down into smaller hydrocarbon molecules using cracking.

(i) Complete the equation to show the formula of the second product.



[1]

(ii) Explain why C_6H_{12} is **not** an alkane.

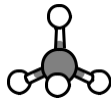
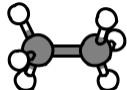
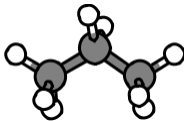
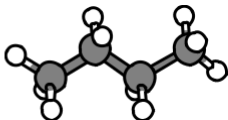
.....

..... [1]

(d) Other types of formula can be used to show hydrocarbon molecules.

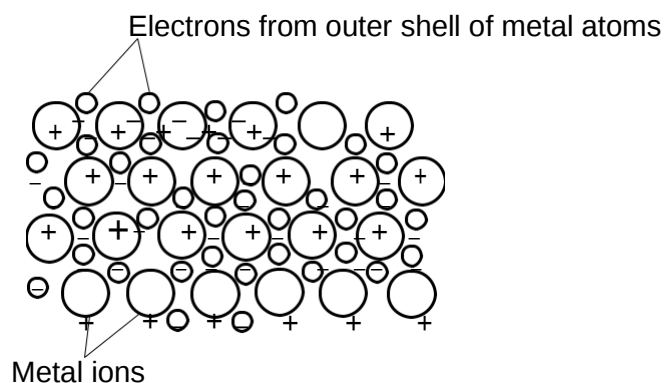
The table shows examples of these formulae.

Complete the table.

Alkane	Molecular Formula	Empirical Formula	Displayed Formula	3D Structure
.....	CH ₄	CH ₄		
Ethane		CH ₃	$ \begin{array}{c} H \quad H \\ \quad \\ H-C-C-H \\ \quad \\ H \quad H \end{array} $	
Propane	C ₃ H ₈		$ \begin{array}{c} H \quad H \quad H \\ \quad \quad \\ -C-C-C- \\ \quad \quad \\ H \quad H \quad H \end{array} $	
Butane	C ₄ H ₁₀		$ \begin{array}{c} HHHH \\ - HCCCCH - \\ HHHH \end{array} $	

[5]

- 8 The diagram shows the structure of a metal.



- (a) The properties of a metal depend on its structure.

Complete the sentences to explain the properties of metals.

Use words from the list.

Atoms	Electrons	Ions
-------	-----------	------

Metals conduct electricity when solid because the can move.

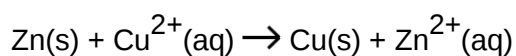
Metals are malleable because the can slide over each other.

Metals have high melting points because there is a strong attraction between the and the

[3]

- (b) A student does some experiments to find the reactivities of some metals.

- (i) In one experiment, they add a piece of zinc to a blue aqueous solution of copper ions. They see a reddish metal formed and the blue solution fades to colourless.

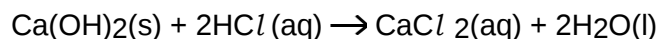


Complete the sentence to explain how this reaction shows that zinc is more reactive than copper. Put a ring around the correct option.

Zinc is more reactive than copper because it **gains** / **loses** / **shares** electrons more easily than copper.

[1]

- 10 A student is investigating the reaction between calcium hydroxide and hydrochloric acid.



- (a) They want to find the temperature change during the reaction.

1 g masses of solid calcium hydroxide are added one by one to 50 cm³ of dilute hydrochloric acid in a plastic cup.

Describe **two** measurements the student needs to make **and** the apparatus needed to make the measurements.

1.
-
2.
-

[2]

- (b) The table shows the student's results:

Mass of calcium hydroxide (g)	Temperature of hydrochloric acid (°C)
0	22.0
1	29.5
2	37.0
3	44.5
4	52.0
5	59.5

Plot the results from the table on the graph.

Two points have already been plotted.

[2]

- (c) Draw a line of best fit.

[1]

13. Subject-specific Marking Instructions

INTRODUCTION

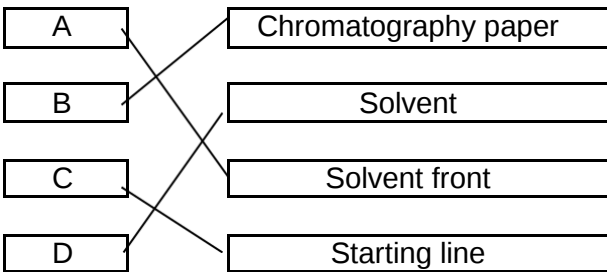
Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

Question			Answer	Marks	AO element	Guidance
5	(a)	(i)	T F T ✓✓	2	1.1	3 correct = 2 marks 1 or 2 correct = 1 mark
		(ii)	Movement – faster/more freely/vibrate more ✓ Arrangement – more random/move further apart/not in a fixed position/spread out/spaced out/no longer in contact ✓	2	1.1	ALLOW idea of moving but still touching ALLOW particles sliding past one another
	(b)		Liquid ✓	1	3.2a	
	(c)	(i)	It contains only one element or compound. ✓	1	1.1	
		(ii)	Single temperature if pure/range if impure./ORA ✓	1	1.1	ALLOW specific/precise temperature
	(d)	(i)	 ✓✓✓	3	1.2	4 correct = 3 marks 3 or 2 correct = 2 marks 1 correct = 1 mark
		(ii)	Only one spot/dot (moves up the paper) ✓	1	1.2	ALLOW a single colour(streak/line/blob)
		(iii)	Use a locating agent at the end. ✓	1	1.2	

Question			Answer	Marks	AO element	Guidance
8	(a)		Electrons ✓ Ions ✓ Ions AND electrons ✓	3	1.1	ALLOW in either order
	(b)	(i)	Loses ✓	1	3.1a	
		(ii)	Magnesium Iron Copper Silver ✓✓	2	3.2b	Mg most reactive and silver least reactive = 1 mark Iron more reactive than copper = 1 mark ALLOW use of element symbols, but NOT ion symbols
	(c)	(i)	More reactive: Bubbles/effervescent ✓ Faster/more OR Metal disappears ✓ Quicker ✓	2	1.2	Assume 'it' = more reactive metal If named metals from b(ii) ALLOW ECF if matched to their order of reactivity ALLOW solution warms up more for 2 marks
		(ii)	Not all metals react (with acid) / some metals react too violently (with acids) ✓	1	3.2a	
		(iii)	Pops a lighted splint. ✓	1	1.2	