



























- 4 (a) Five solutions were tested to find their pH. The results are recorded in the table below.

Solution	pH value
Soap solution	10
Sulphuric acid	1
Water	7
Sodium hydroxide	14
Lemon juice	5

- (i) Describe the method the student should use to determine the pH of each solution.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

- (ii) Using only the solutions given in the table above, state an example of each of the following:

A weak acid \_\_\_\_\_

A strong alkali \_\_\_\_\_

Neutral \_\_\_\_\_ [3]

- (iii) Hydrogen ions are found in all acidic solutions. Write the symbol for a hydrogen ion including its charge.

\_\_\_\_\_ [1]

- (iv) The ion found in all alkalis is  $\text{OH}^-$ . Name this ion.

\_\_\_\_\_ [1]

Examiner Only

Marks Remark

(v) Name the salt produced when sulphuric acid reacts with sodium hydroxide solution.

\_\_\_\_\_ [1]

(vi) Write a balanced symbol equation for the reaction between sulphuric acid and sodium hydroxide solution.

\_\_\_\_\_ [3]

(b) Lead(II) iodide,  $\text{PbI}_2$ , is a toxic yellow solid used as a pigment by painters in the nineteenth century. It is insoluble in water.

(i) Name two solutions which would react together to form insoluble lead(II) iodide.

Solution 1: \_\_\_\_\_

Solution 2: \_\_\_\_\_ [2]

(ii) Draw a labelled diagram of the assembled apparatus used to recover the lead(II) iodide when the reaction is finished.

[3]

(iii) Suggest how the solid lead(II) iodide should be dried.

\_\_\_\_\_  
\_\_\_\_\_ [1]

Examiner Only

Marks Remark

- (iv) The bonding in lead(II) iodide is ionic. Write the symbols for the lead(II) ion and the iodide ion. You may use your Data Leaflet to help answer this answer.

Lead(II) ion \_\_\_\_\_

Iodide ion \_\_\_\_\_ [2]

- (v) Using your Data Leaflet, write the formula of another insoluble lead compound.

\_\_\_\_\_ [1]

Examiner Only

Marks Remark

- 5 (a) Coal is a fossil fuel. It consists mainly of the element carbon but with some hydrogen, nitrogen and sulphur.



[http://www.boltonmuseums.org.uk/images/geologyimages/coal\\_group.jpg](http://www.boltonmuseums.org.uk/images/geologyimages/coal_group.jpg)

When coal burns, the elements it contains undergo combustion. The scheme below gives some details of this combustion.

<b>Reactants</b>	<b>Name</b>		Sulphur	
	<b>Formula</b>	N <sub>2</sub>	S	C
<b>Combustion</b>				
<b>Products</b>	<b>Name</b>	Nitrogen dioxide		Carbon dioxide
	<b>Formula</b>		SO <sub>2</sub>	

- (i) Complete the scheme above, filling in the missing names and formulae. [5]

- (ii) What is meant by the term combustion?

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[3]

Examiner Only

Marks Remark



**(iii)** Which element in coal is responsible for its distinctive colour?

\_\_\_\_\_ [1]

**(iv)** What is the common name for the oxide of hydrogen?

\_\_\_\_\_ [1]

**(v)** Describe how fossil fuels are formed.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

**Quality of Written Communication** [2]

**(b)** The objects listed below are all made from materials which are hydrocarbons. Hydrocarbons can be solids, liquids or gases.

**Polystyrene    Petrol    Polythene    Methane    Candle wax**

**(i)** What is a hydrocarbon?

\_\_\_\_\_  
\_\_\_\_\_ [2]

Examiner Only	
Marks	Remark

- (ii) Complete the table below indicating whether the hydrocarbon materials shown are solid, liquid or gas. Place **one** tick (✓) in each row.

Material	Solid	Liquid	Gas
Polystyrene			
Petrol			
Polythene			
Methane			
Candle wax			

[5]

- (iii) Write a balanced symbol equation for the complete combustion of methane, CH<sub>4</sub>.

\_\_\_\_\_ [3]

- (iv) When hydrocarbons burn in a limited supply of air a toxic gas is produced. Name this toxic gas.

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

6 Chemical reactions are either exothermic or endothermic.

(a) What do you understand by the term exothermic?

\_\_\_\_\_  
\_\_\_\_\_ [1]

(b) The table below gives the word equations for several exothermic reactions.

Reaction	Word Equation
<b>A</b>	hydrogen + oxygen $\rightarrow$ water
<b>B</b>	sodium hydroxide + hydrochloric acid $\rightarrow$ sodium chloride + water
<b>C</b>	magnesium + carbon dioxide $\rightarrow$ magnesium oxide + carbon
<b>D</b>	copper(II) oxide + magnesium $\rightarrow$ magnesium oxide + copper

(i) Name the type of reaction represented by **A** and **B**.

**A** \_\_\_\_\_ [1]

**B** \_\_\_\_\_ [1]

(ii) Write a balanced symbol equation for Reaction **A**.

\_\_\_\_\_ [3]

Examiner Only

Marks Remark

(c) In reaction C, a piece of burning magnesium metal is lowered into a gas jar of carbon dioxide gas.

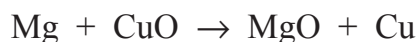
(i) Write a balanced symbol equation for the reaction between magnesium and carbon dioxide.

\_\_\_\_\_ [3]

(ii) Describe what would be observed during this reaction.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

(d) Reaction D is described as a redox reaction as both oxidation and reduction are occurring at the same time. The balanced symbol equation for the reaction is given below.



(i) Explain why magnesium is described as being oxidised in this reaction.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

(ii) Explain why copper is described as being reduced in this reaction.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

(iii) What colour is copper(II) oxide?

\_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

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**THIS IS THE END OF THE QUESTION PAPER**

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