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SECTION A

1. Use the Periodic Table on page 2 to help you answer this question.

(a) How many periods are shown in the Periodic Table?

..... (1)

(b) Which element is in both Period 2 and Group 3?

..... (1)

(c) Which two types of particle are present in the nucleus of a helium atom?

..... (1)

(d) How many protons are in an atom of neon?

..... (1)

(e) Which two elements in Period 6 have the same relative atomic mass?

..... (1)

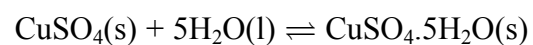
(Total 5 marks)

Q1



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2. A reaction involving copper(II) sulphate can be represented by the equation



The reaction is described as reversible because it can go in either direction.

(a) State the colour change of the copper(II) sulphate in the forward reaction.

Colour at start

Colour at finish

(2)

(b) Use words from the box to complete a description of this reaction.

dehydration	endothermic	evaporation
exothermic	hydration	neutralisation

Each word may be used once or not at all.

The forward reaction is described as because
there is an increase in temperature. The type of reaction occurring
is

The reverse reaction can be described as both and
.....

(4)

Q2

(Total 6 marks)



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3. Ammonia is manufactured by the Haber process.

(a) Name the two gaseous elements used to manufacture ammonia and state one source of each.

Name of element 1

Source of element 1

Name of element 2

Source of element 2

(4)

(b) State the pressure and the temperature used in the Haber process.

Pressure

Temperature

(2)

(c) Name two important chemicals made from ammonia.

1

2

(2)

Q3

(Total 8 marks)

5

Turn over



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4. (a) Chlorine is an element in Group 7 of the Periodic Table.
Chlorine reacts with hydrogen to form hydrogen chloride gas.
Hydrogen chloride gas dissolves in water to form hydrochloric acid.

The table shows some information about chlorine, hydrogen chloride and hydrochloric acid.

Complete the table.

Name of substance	Colour	State symbol	Effect on damp blue litmus paper
Chlorine	pale green		
Hydrogen chloride		g	
Hydrochloric acid			paper turns red

(6)

- (b) A student adds chlorine to a solution of sodium bromide. The solution changes from colourless to yellow-orange.

(i) Write a word equation for the reaction that occurs.

.....
.....

(1)

(ii) State the type of reaction that occurs.

.....

(1)

- (c) Another student adds bromine to a solution of sodium chloride. Why does no reaction occur?

.....

(1)

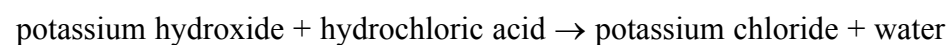
Q4

(Total 9 marks)



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5. Potassium chloride is a soluble salt that can be prepared using the reaction



(a) Write a **chemical** equation for the reaction used to prepare potassium chloride.

.....

.....

(2)

(b) Solutions of potassium chloride and similar salts can be tested as shown in the table.

Complete the table.

Salt solution	Flame test	Addition of silver nitrate solution		
	Colour of flame	Result	Insoluble product formed	Soluble product formed
potassium chloride		white precipitate	silver chloride	potassium nitrate
sodium bromide				

(5)

Q5

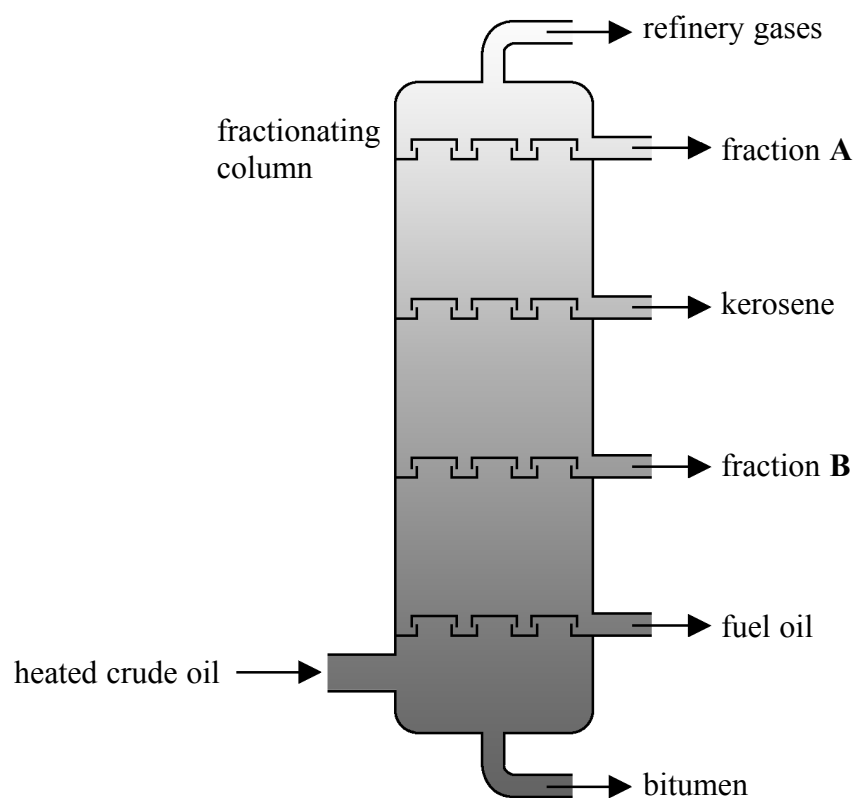
(Total 7 marks)

7



Turn over

6. Crude oil is a complex mixture of hydrocarbons. The diagram shows how the hydrocarbons in crude oil can be separated into fractions by fractional distillation.



(a) Use words from the box to complete the description of fractional distillation.

Each word may be used once, more than once, or not at all.

burns	condenses	decomposes
evaporates	higher	lower

When the crude oil is heated, most of it

Each fraction at a different level.

The temperature changes from the top to the bottom of the column.

The temperature is at the top of the column.

The kerosene fraction collects at a higher level than the fuel oil fraction because kerosene has a boiling point range.

(4)



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(b) Fractions **A** and **B** are both used in fuels for road vehicles. State the name of

fraction **A**

fraction **B**

(2)

(c) One compound present in fraction **A** is octane.

Write a word equation for the **complete** combustion of octane.

.....

.....

(2)

(d) The **incomplete** combustion of octane produces a poisonous gas. Identify the gas and explain why it is poisonous.

.....

.....

.....

.....

(2)

Q6

(Total 10 marks)

TOTAL FOR SECTION A: 45 MARKS



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SECTION B

7. The pictures show some uses of metals.

a coating to prevent rusting



electrical wiring



railway tracks



Complete the table.

Use	Name of metal with this use	Property on which the use depends
a coating to prevent rusting		
electrical wiring		
railway tracks		

(Total 6 marks)

Q7



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8. Use the Periodic Table on page 2 to help you answer this question.

(a) Identify the most reactive metallic element in the Periodic Table.

.....
(1)

(b) Give the formula of the compound formed between sodium and the most reactive element in Group 7.

.....
(1)

(c) All of the metals in Group 1 react with water. There are similarities between the reactions. Put a cross (☒) in **three** boxes to show which statements apply to the reactions of **all** Group 1 metals with water.

- a flame is seen ☒
- a solution of the metal hydroxide is formed ☒
- a solution of the metal oxide is formed ☒
- carbon dioxide is formed ☒
- hydrogen is formed ☒
- the metal sinks ☒
- the solution formed is acidic ☒
- the solution formed is alkaline ☒

(3)

(d) The elements in Group 0 were originally thought to be totally unreactive. However, in 1962 the first compound of xenon was made but it was not until 2000 that the first compound of argon was made.

What does this order of discovery suggest about the trend in reactivity of the elements in Group 0?

.....
.....
(1)

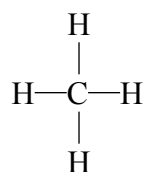
Q8

(Total 6 marks)



9. Methane, CH₄, is an organic compound. It is the first member of an homologous series of **saturated hydrocarbons**.

The displayed formula of methane is



- (a) What is meant by the term **hydrocarbon**?

.....
.....
.....

(2)

- (b) What is meant by the term **saturated**?

.....
.....

(1)

- (c) Name the homologous series of which methane is the first member.

.....

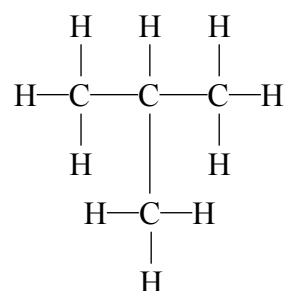
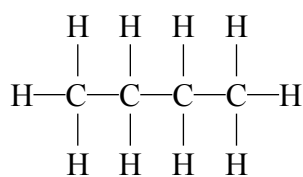
(1)

- (d) Draw the displayed formula of the second member of this homologous series.

(2)



(e) The displayed formulae of two other organic compounds are



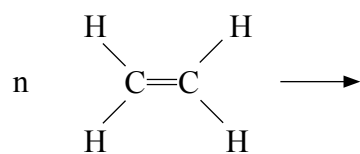
(i) What is the molecular formula of these two compounds?

..... (1)

(ii) What name is given to compounds that have the same molecular formula but different displayed formulae?

..... (1)

(f) Some other organic compounds are used to make polymers.
 Poly(ethene) is an addition polymer made from many identical monomer molecules.
 Complete the following equation to show the formation of poly(ethene).



(2)

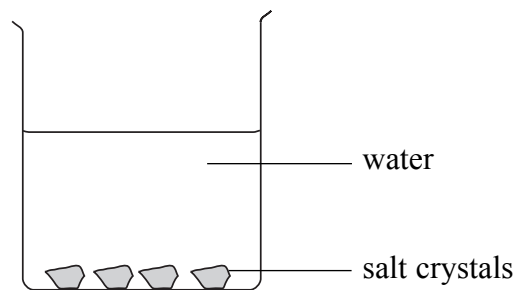
Q9

(Total 10 marks)

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10. A few crystals of a green salt are placed in a beaker of cold water. The crystals start to dissolve.



(a) Describe how the appearance of the contents of the beaker change over a period of a few days.

.....
.....
.....
.....

(2)

(b) Name the process that occurs after the crystals dissolve.

.....

(1)

(c) How will the results of the experiment differ if hot water is used in place of cold water? Explain your answer.

Difference

.....

Explanation

.....

(2)



(d) A sample of the solution is removed from the beaker. Describe a test, and its result, that would show the sample contains ammonium ions.

Test

.....

Result

.....

(3)

(Total 8 marks)

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Q10

TOTAL FOR SECTION B: 30 MARKS

TOTAL FOR PAPER: 75 MARKS

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