Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						4	4	3	7	/	2	F	Signature	

Paper Reference(s)

4437/2F

Examiner's use only

Team Leader's use only

London Examinations IGCSE

Science (Double Award)

Chemistry

Paper 2F

Foundation Tier

Wednesday 17 June 2009 – Morning

Time: 1 hour 15 minutes

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname and initial(s) and your signature.
The paper reference is shown at the top of this page. Check that you have the correct question paper.
Answer ALL the questions. Writer your answers in the spaces provided in this question paper.
Show all stages in any calculations and state the units. Calculators may be used.
Some questions must be answered with a cross in a box (☒). If you change your mind about an answer, put a line through the box (~~☒~~) and then mark your new answer with a cross (☒).

Information for Candidates

The total mark for this paper is 75. The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 10 questions in this question paper.
There are 16 pages in this question paper. Any blank pages are indicated.
A Periodic Table is given on page 2.

Advice to Candidates

Write your answers neatly and in good English.

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THE PERIODIC TABLE

Period	1	2											3	4	5	6	7	0
	Group																	
1	1 H Hydrogen 1																	4 He Helium 2
2	7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10
3	23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulphur 16	35.5 Cl Chlorine 17	40 Ar Argon 18
4	39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	63.5 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36
5	86 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	99 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54
6	133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	179 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86
7	223 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89															

Key

Relative atomic mass
Symbol
Name
Atomic number

Leave blank

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) **Q1**

(Total 5 marks)

Leave blank

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

$$CuSO_4(s) + 5H_2O(l) \rightleftharpoons CuSO_4.5H_2O(s)$$

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)

Leave blank

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)

Leave blank

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)

(Total 9 marks)

Q4

Leave blank

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

potassium hydroxide + hydrochloric acid → potassium chloride + water

(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				

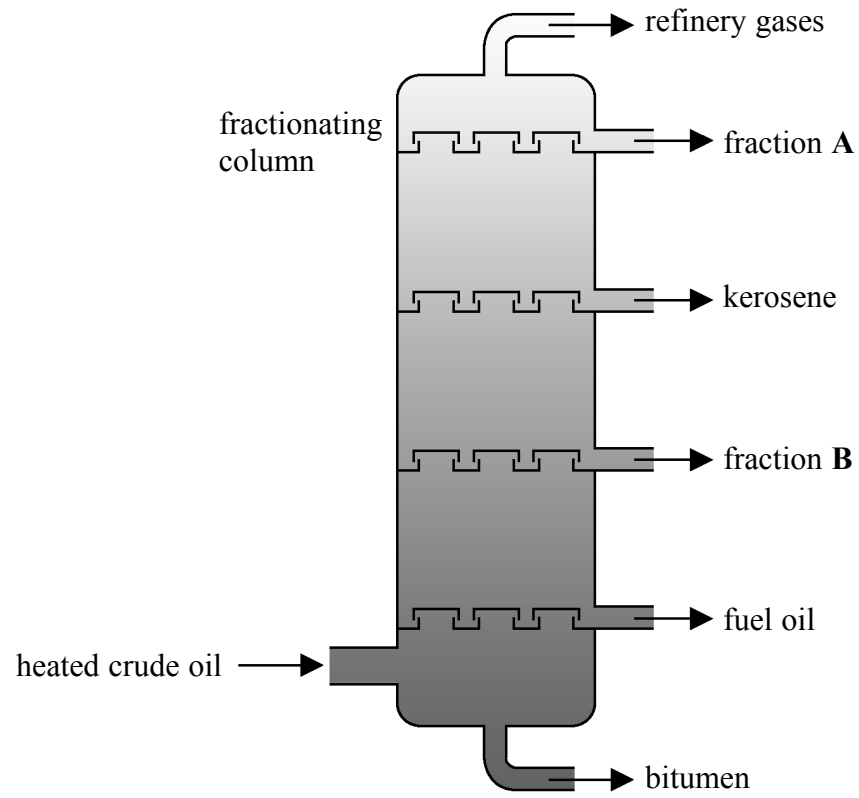
(5)

(Total 7 marks)

Q5

Leave blank

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)

Leave blank

(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

Leave blank

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

Leave blank

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?

.....

.....

.....

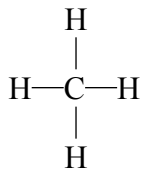
(1)

Q8

(Total 6 marks)

Leave blank

9. Methane, CH_4, 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.

.....

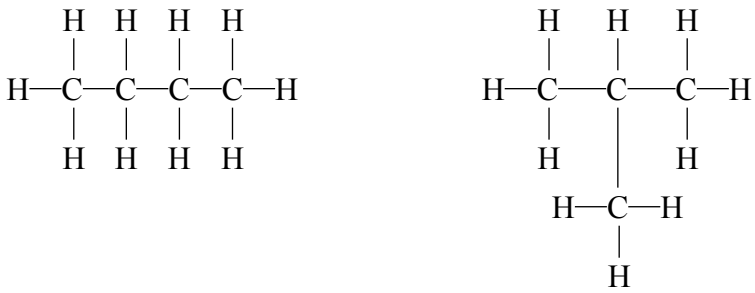
(1)

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

(2)

Leave blank

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



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

.....

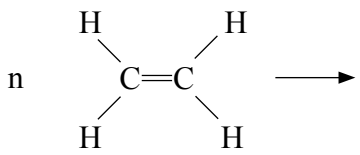
(1)

(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).



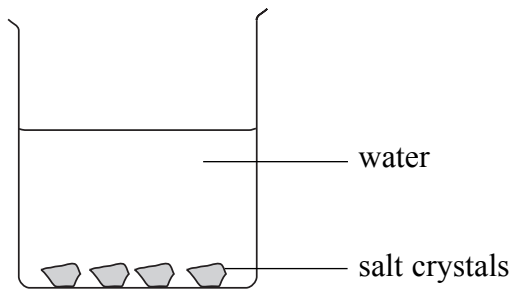
(2)

Q9

(Total 10 marks)

Leave blank

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)

Leave blank

(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) **Q10**

(Total 8 marks)

TOTAL FOR SECTION B: 30 MARKS

TOTAL FOR PAPER: 75 MARKS

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