Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						1	5	2	1	/	2	F	Signature	

Paper Reference(s)

1521/2F

Edexcel GCSE

Science: Single Award A [1521]

Paper 2F

Foundation Tier

Wednesday 13 June 2007 – Morning

Time: 1 hour

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

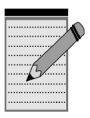
Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
The paper reference is shown above.
Answer **ALL** questions in the spaces provided in this book.
Show all stages in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for the various parts of questions are shown in round brackets, e.g.: **(2)**.
This paper has five questions. There is one blank page.

Advice to Candidates



This symbol shows where the quality of your written answer will also be assessed.

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THE PERIODIC TABLE

Period	1	2											3	4	5	6	7	0
																		4 He Helium 2
1	1 H Hydrogen 1																	
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	85 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	178 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

1. The element chlorine is a non-metal in group 7 of the periodic table.

(a) (i) What is the name given to the group 7 elements?

.....

(1)

(ii) What is the chemical symbol for an atom of chlorine?

.....

(1)

(iii) Give the name and symbol for an element in group 7 that is more reactive than chlorine.

name .....

symbol .....

(2)

(b) Draw one line from each group 7 element to its appearance at room temperature.

element	**appearance**
bromine	green gas
chlorine	red-brown liquid
iodine	red-brown solid
	silver-grey solid

(3)

(c) Chlorine reacts with most metals.

Complete the word equation for the reaction between sodium and chlorine to form sodium chloride.

sodium + [ ] → [ ]

(2)

(d) Why is chlorine added to water by water companies?

.....

.....

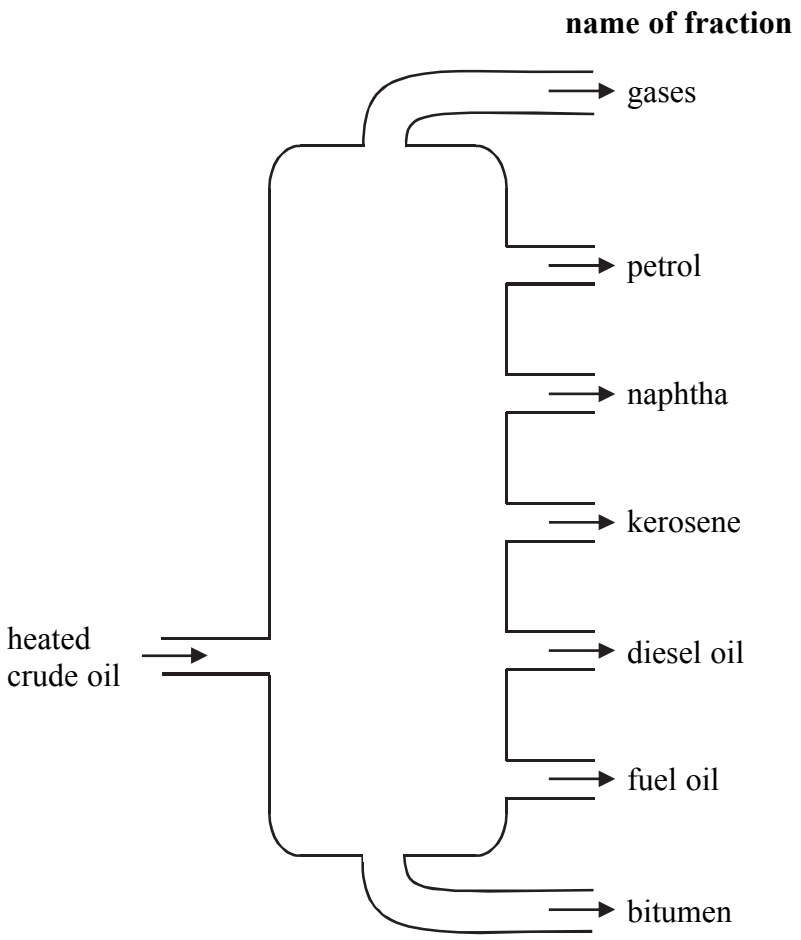
(1)

Q1

(Total 10 marks)

Leave blank

2. Crude oil is a mixture of many different substances. It can be separated into fractions as shown in the diagram below.



(a) What name is given to the process used to separate crude oil into fractions?

.....

(1)

(b) Draw **one** line from each fraction to its use.

fraction	use
bitumen	aviation fuel
fuel oil	car fuel
petrol	fuel for ships
	tar for roads

(3)

Leave blank

(c) When petrol burns in air, carbon dioxide and water are formed.

(i) Give the name of the gas in air which reacts with the petrol.

.....

(1)

(ii) Give the formula for carbon dioxide.

.....

(1)

(iii) Describe the test for carbon dioxide.

.....

.....

.....

.....

.....

.....

.....

.....

(4)

(iv) Cobalt chloride paper changes colour when used to test for water.

What colour change takes place?

from ..... to .....

(2)

(d) Some of the compounds obtained from crude oil are made into polymers.

The polymer poly(ethene) is used to make carrier bags.

Give **two** properties of poly(ethene) that make it suitable for carrier bags.

1 .....

2 .....

(2)

Q2

(Total 14 marks)

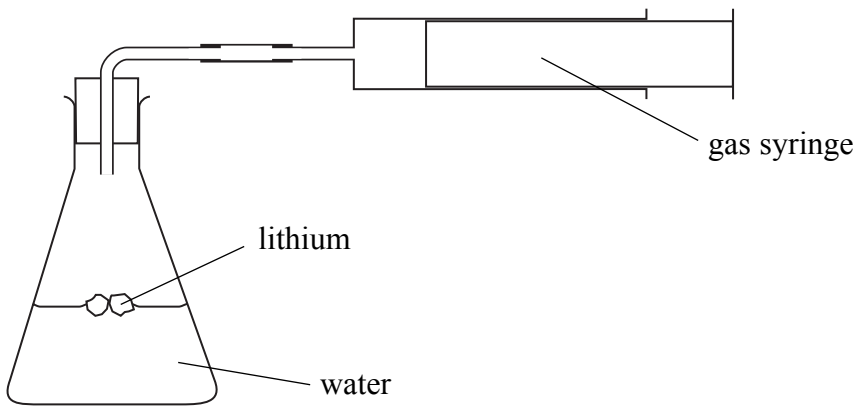
Leave blank

3. Lithium is in group 1 of the periodic table.

Lithium reacts with water to form lithium hydroxide and hydrogen.

lithium + water → lithium hydroxide + hydrogen

The hydrogen formed can be collected and its volume measured using the apparatus shown.

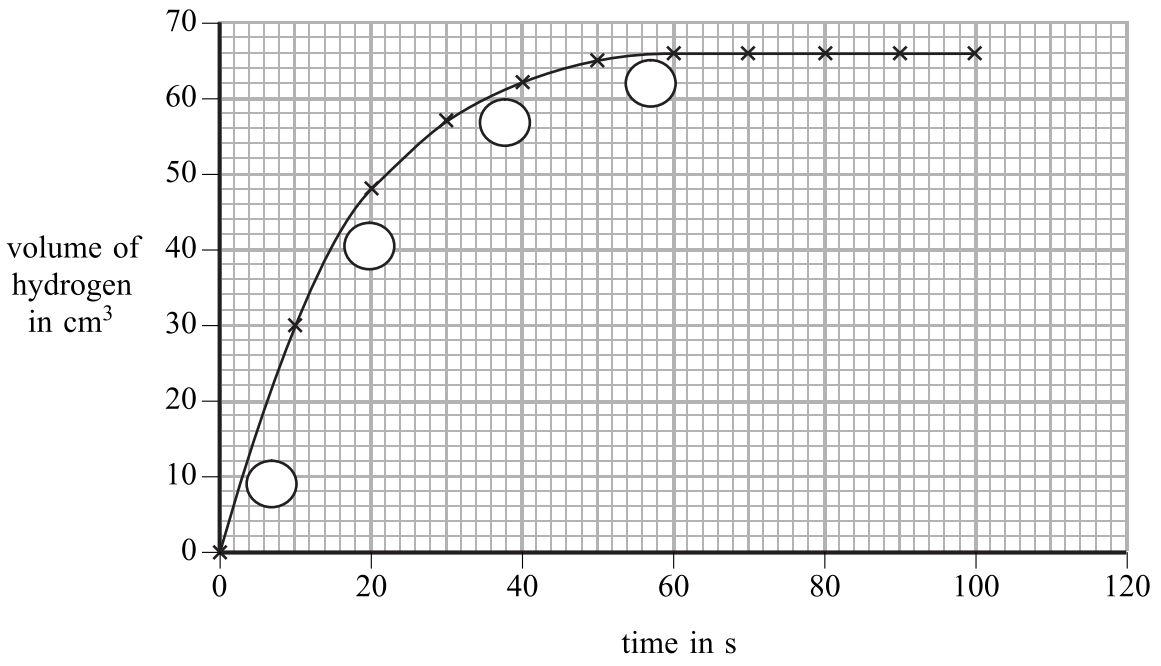


(a) Use the periodic table to find the atomic number of lithium.

The atomic number of lithium is .....

(1)

(b) The following graph was obtained by plotting the total volume of hydrogen produced against time in seconds.



(i) In one of the circles ◯ on the graph, mark **X** where the reaction was fastest.

(1)

Leave blank

(ii) What was the final volume of hydrogen produced?

.....

(1)

(c) (i) When smaller pieces of lithium are used, the reaction is faster.
Explain why.

.....

.....

(1)

(ii) Describe another way to make this reaction faster.

.....

.....

(1)

(d) (i) Universal indicator is added to the lithium hydroxide solution.
What colour is seen?

.....

(1)

(ii) Explain why this colour is seen.

.....

(1)

(e) When sodium is used instead of lithium, a similar reaction takes place.

(i) Why would you expect a similar reaction to take place?

.....

.....

(1)

(ii) Describe how the reaction of sodium with water is different from that of lithium with water.

.....

.....

(1)

(f) Name a metal in group 1 that is more reactive with water than lithium and sodium.

.....

(1)

Q3

(Total 10 marks)

Leave blank

4. Read the following news item that appeared in June 2004.

> Wales is likely to become the first country in the world to mass-produce a new fuel called hithane. Hithane is a mixture of hydrogen and methane. Burning hithane instead of petrol would produce a third less carbon dioxide. Under the Kyoto treaty on reducing greenhouse gases, European governments have agreed to reduce carbon dioxide emissions.

(a) When hydrogen burns, it reacts with oxygen in the air to produce water.

(i) Balance the equation and fill in the missing state symbols.

$$H_2(g) + O_2(\ \ ) \rightarrow H_2O(\ \ )$$

(2)

(ii) Give the name of the type of bonding between hydrogen and oxygen atoms in a water molecule.

.....

(1)

(iii) Draw a dot and cross diagram of a water molecule, showing only the outer electrons.

(2)

(b) Methane, CH_4, is a hydrocarbon.

(i) What is meant by the term **hydrocarbon**?

.....

.....

(2)

(ii) Name a natural source of methane.

.....

(1)

Leave blank

(c) Incomplete combustion of petrol or methane produces carbon monoxide.

Explain the dangers of carbon monoxide in enclosed spaces.

.....

.....

.....

.....

.....

.....

.....

.....

(3)

(d) Suggest why the use of hithane instead of petrol would reduce carbon dioxide emissions.

.....

.....

.....

.....

.....

(2)

(Total 13 marks)

Q4

Leave blank

5. When a piece of heated potassium is put into a gas jar of chlorine, potassium chloride is formed.

(a) Complete the table to show the relative mass, relative charge and position in an atom of an electron, a neutron and a proton.

particle	relative mass	relative charge	position in the atom
electron	negligible	–1	orbiting the nucleus
neutron	.....	0	in the nucleus
proton	1	.....	.....

(3)

(b) A potassium atom has an atomic number of 19 and a mass number of 39.

Write down the number of each type of particle in this atom of potassium.

number of electrons .....

number of neutrons .....

number of protons .....

(3)

(c) Give the electronic structure for an atom of potassium.

.....

(2)

(d) Chlorine has seven electrons in its outer shell.

What information does this give about its position in the periodic table?

.....

.....

(1)

Leave blank

(e) Describe what you would **see** when potassium chloride is added to water and stirred.

.....

.....

.....

.....

.....

.....

(2)

(f) Bromine is below chlorine in the halogen group.

Describe how the electronic structures of chlorine and bromine atoms are similar.

.....

.....

.....

(2)

Q5

(Total 13 marks)

TOTAL FOR PAPER: 60 MARKS

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