

FOR OFFICIAL USE

--	--	--	--	--	--

G

KU PS

Total  
Marks

--	--

**0500/401**

NATIONAL  
QUALIFICATIONS  
2007

THURSDAY, 10 MAY  
9.00 AM – 10.30 AM

CHEMISTRY  
STANDARD GRADE  
General Level

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth

Day Month Year

--	--	--	--	--	--	--	--

Scottish candidate number

--	--	--	--	--	--	--	--	--	--

Number of seat

- 1 All questions should be attempted.
- 2 Necessary data will be found in the Data Booklet provided for Chemistry at Standard Grade and Intermediate 2.
- 3 The questions may be answered in any order but all answers are to be written in this answer book, and must be written clearly and legibly in ink.
- 4 Rough work, if any should be necessary, as well as the fair copy, is to be written in this book.  
Rough work should be scored through when the fair copy has been written.
- 5 Additional space for answers and rough work will be found at the end of the book.
- 6 The size of the space provided for an answer should not be taken as an indication of how much to write. It is not necessary to use all the space.
- 7 Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.



## PART 1

In Questions 1 to 8 of this part of the paper, an answer is given by circling the appropriate letter (or letters) in the answer grid provided.

In some questions, two letters are required for full marks.

If more than the correct number of answers is given, marks will be deducted.

A total of 20 marks is available in this part of the paper.

### SAMPLE QUESTION

A	CH <sub>4</sub>	B	H <sub>2</sub>	C	CO <sub>2</sub>
D	CO	E	C <sub>2</sub> H <sub>5</sub> OH	F	C

(a) Identify the hydrocarbon.

<input checked="" type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C
<input type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F

The one correct answer to part (a) is A. This should be circled.

(b) Identify the **two** elements.

<input type="radio"/> A	<input checked="" type="radio"/> B	<input type="radio"/> C
<input type="radio"/> D	<input type="radio"/> E	<input checked="" type="radio"/> F

As indicated in this question, there are **two** correct answers to part (b). These are B and F. Both answers are circled.

If, after you have recorded your answer, you decide that you have made an error and wish to make a change, you should cancel the original answer and circle the answer you now consider to be correct. Thus, in part (a), if you want to change an answer A to an answer D, your answer sheet would look like this:

<input checked="" type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C
<input checked="" type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F

If you want to change back to an answer which has already been scored out, you should enter a tick (✓) in the box of the answer of your choice, thus:

✓ <input checked="" type="radio"/> A	<input type="radio"/> B	<input type="radio"/> C
<input checked="" type="radio"/> D	<input type="radio"/> E	<input type="radio"/> F

Marks

KU PS

1. The grid contains the names of some elements.

A	copper	B	magnesium	C	iron
D	nitrogen	E	potassium	F	fluorine

- (a) Identify the element discovered in 1807.

You may wish to use page 8 of the data booklet to help you.

A	B	C
D	E	F

1

- (b) Identify the element found in the same group as calcium.

You may wish to use page 8 of the data booklet to help you.

A	B	C
D	E	F

1

- (c) Identify the **two** elements which combine to form a covalent compound.

A	B	C
D	E	F

1

(3)

[Turn over



Marks

KU PS

3. The grid shows the names of some hydrocarbons.

A	methane	B	hexane	C	pentane
D	ethene	E	butene	F	propane

(a) Identify the hydrocarbon with **six** carbon atoms in the molecule.

A	B	C
D	E	F

1

(b) Identify the **two** hydrocarbons which are alkenes.

A	B	C
D	E	F

1

(2)

[Turn over

Marks

KU PS

4. The grid shows the names of some compounds.

A	copper carbonate	B	potassium sulphite
C	sodium fluoride	D	calcium sulphide

- (a) Identify the compound which could be used as a fertiliser.

A	B
C	D

1

- (b) Identify the compound which produces a yellow flame colour.  
You may wish to use page 4 of the data booklet to help you.

A	B
C	D

1

- (c) Identify the **two** compounds which contain oxygen.

A	B
C	D

1

(3)

*Marks*

KU PS

5. A student made the following statements about chemical reactions.

A	A solid is always formed.
B	A gas is always produced.
C	There is always a colour change.
D	A new substance is always formed.

Identify the statement which is true for **all** chemical reactions.

A
B
C
D

**(1)****[Turn over**

Marks

KU PS

6. The grid below shows the names of some oxides.

A	iron oxide	B	copper oxide	C	potassium oxide
D	calcium oxide	E	lead oxide	F	nitrogen dioxide

(a) Identify the oxide produced by the sparking of air in car engines.

A	B	C
D	E	F

1

(b) Identify the oxide which contains an alkali metal.

A	B	C
D	E	F

1

(c) Identify the oxide which dissolves in water to produce an acidic solution.

A	B	C
D	E	F

1

(3)



Marks

KU PS

8. The grid shows the names of some substances.

A	argon	B	crude oil	C	sodium
D	air	E	carbon dioxide	F	silicon

- (a) Identify the **two** non-metal elements.

You may wish to use page 1 of the data booklet to help you.

A	B	C
D	E	F

1

- (b) Identify the **two** mixtures.

A	B	C
D	E	F

2

(3)

Marks

KU PS

**PART 2****A total of 40 marks is available in this part of the paper.**

9. Candle wax contains hydrocarbons.

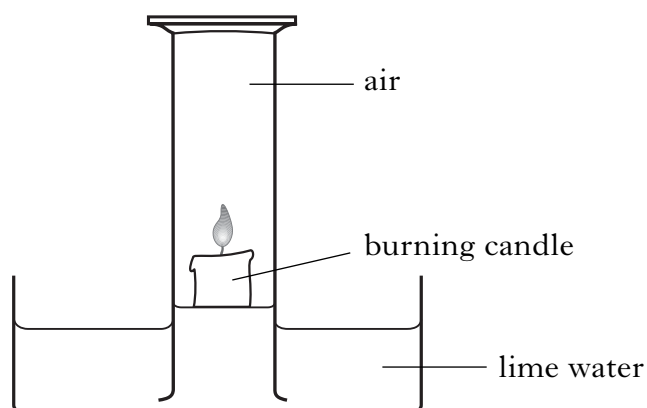
(a) Name the elements present in a hydrocarbon.

---

---

1

(b) A student carried out the following experiment.



(i) Which gas is used up when a candle burns?

---

1

(ii) In the experiment, a gas was produced which turned the lime water milky.

Name the gas produced.

---

1

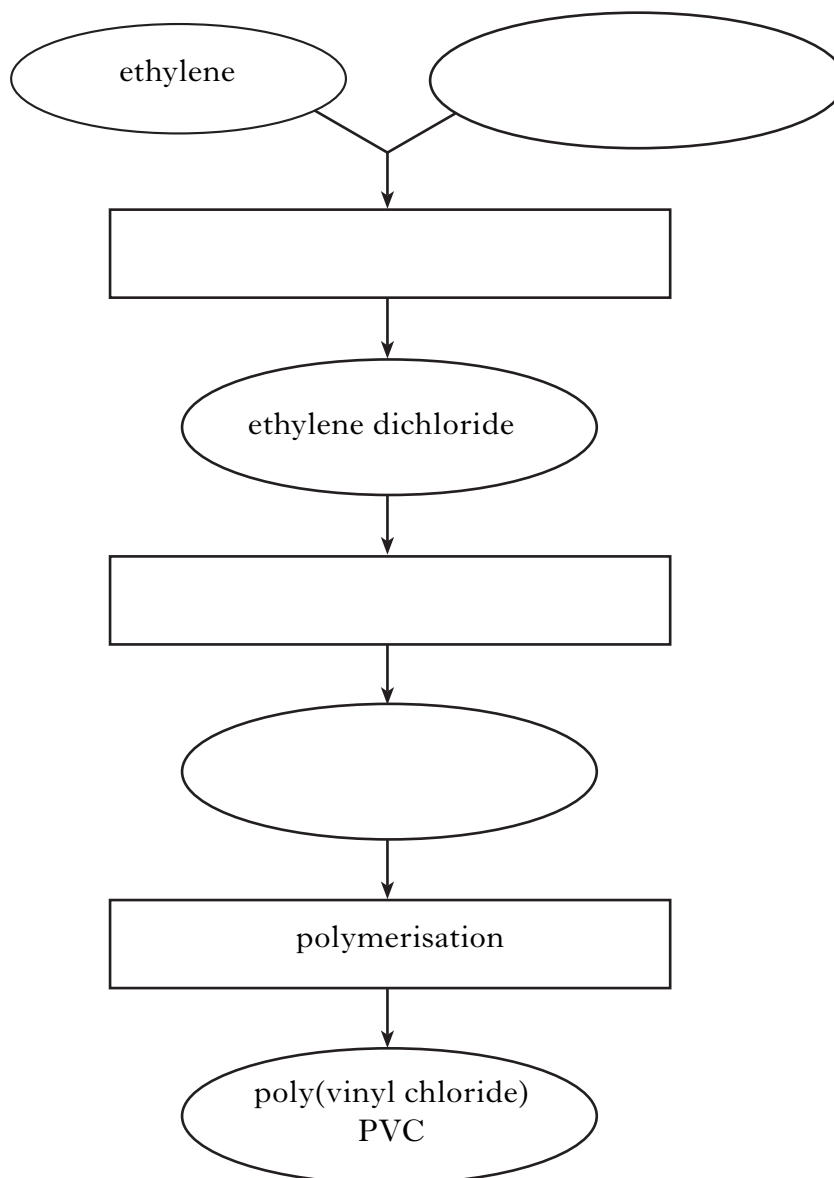
(3)

**[Turn over**

**10. PVC Production**

In the manufacture of PVC, ethylene and chlorine are passed through a catalyst chamber producing ethylene dichloride. The ethylene dichloride is then cracked to produce vinyl chloride which undergoes polymerisation to form the plastic poly(vinyl chloride), PVC.

(a) Use this information to complete the flow diagram.



2

Marks

	KU	PS
2		
1		
1		
(6)		

**10. (continued)**

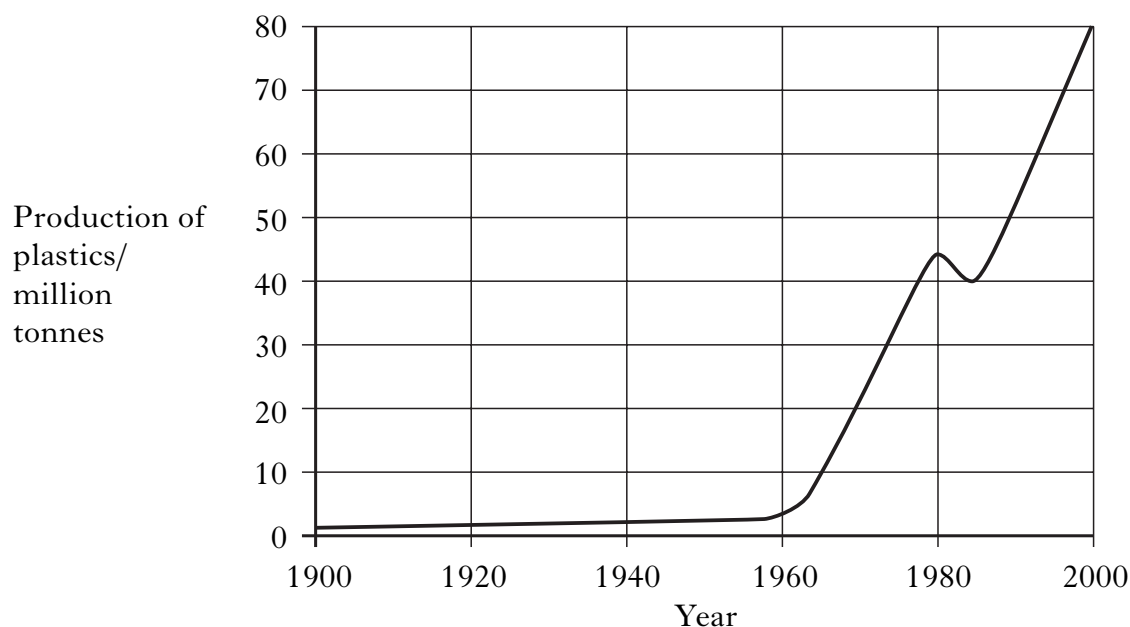
(b) Plastics have many different uses. Poly(vinyl chloride) can be used to make clothes. The non-stick coating on saucepans is made from poly(tetrafluoroethene). Plastic bags are made from poly(ethene) while washing-up bowls are made from poly(propene).

Present this information as a table with suitable headings.

(c) Name the monomer used to make poly(ethene).

\_\_\_\_\_

(d) The graph shows the world production of plastics.



Describe the general trend in the production of plastics from 1960 to 2000.

\_\_\_\_\_

\_\_\_\_\_





Marks

KU	PS
----	----

12. The Falkirk Wheel is a steel structure which carries boats from one level of the canal to another.



- (a) The Falkirk Wheel is painted to prevent rusting.

How does painting prevent rusting?

---



---

1

- (b) Suggest another method of preventing steel from rusting.

---

1

- (c) (i) Steel is an alloy

What is meant by the term alloy?

---

1

- (ii) The table gives information on the hardness of some steel alloys.

<i>Carbon present in steel alloy/%</i>	<i>Hardness/units</i>
0.1	123
0.2	157
0.3	190
0.4	220
0.5	260

Predict the hardness of a steel alloy containing 0.6% carbon.

\_\_\_\_\_ units

1

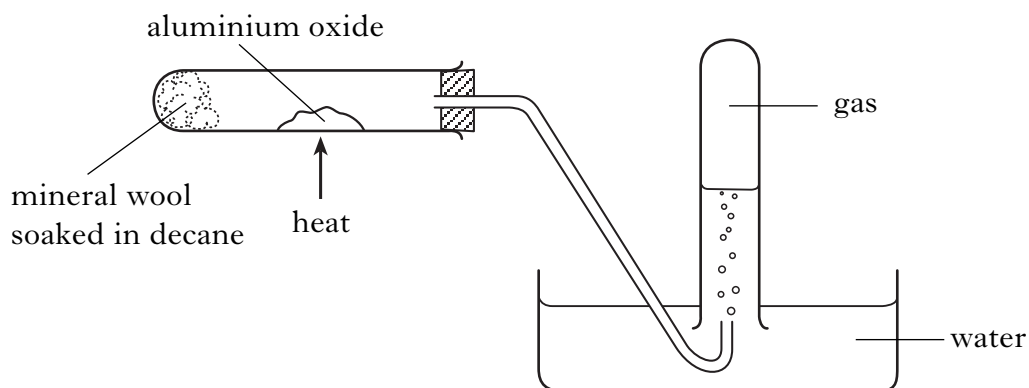
(4)



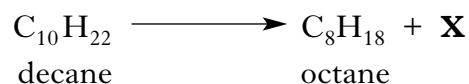
Marks

KU PS

14. Cracking long-chain hydrocarbons produces smaller, more useful molecules.



One of the reactions taking place is:



- (a) Draw a structural formula for octane.

1

- (b) (i) Write the molecular formula for **X**.

1

- (ii) **X** decolourises bromine solution.

What does this indicate about **X**?

\_\_\_\_\_

1

- (c) 0.1 g of aluminium oxide was used as a catalyst.

- (i) What mass of aluminium oxide will be present at the end of the experiment?

\_\_\_\_\_ g

1

- (ii) Write the formula for aluminium oxide.

1

(5)



Marks

KU PS

16. Starch and sucrose are carbohydrates.

(a) Describe the chemical test, including the result, for starch.

---



---

1

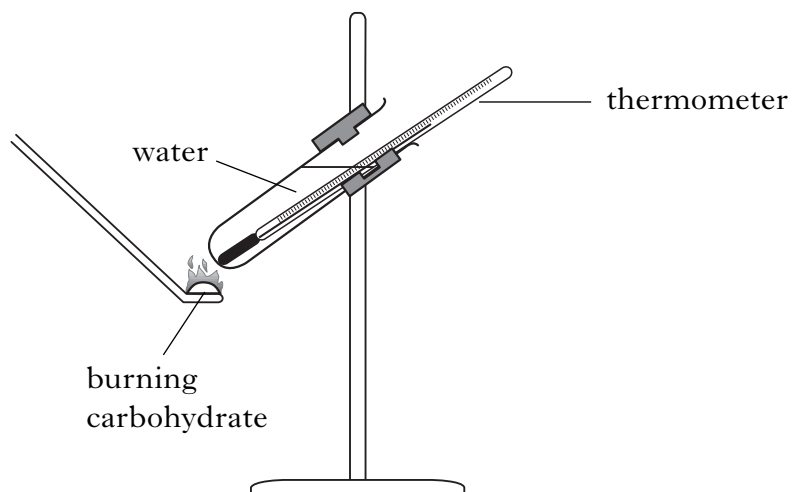
(b) Starch is made by joining glucose molecules together.

Name the **type** of chemical reaction taking place.

---

1

(c) Harry set up an experiment to investigate the burning of carbohydrates.



His results are shown below.

<i>Carbohydrate</i>	<i>Starting temperature of water/°C</i>	<i>Final temperature of water/°C</i>
starch	18	38
sucrose	18	52

<i>Marks</i>	KU	PS
<b>1</b>		
<b>1</b>		
<b>1</b>		
<b>(5)</b>		

**16. (c) (continued)**

(i) Which carbohydrate, starch or sucrose, released the most heat energy?

\_\_\_\_\_

(ii) Harry used the same volume of water in each experiment.  
Suggest another variable which would have to be kept the same to make a fair comparison.

\_\_\_\_\_

(d) Animals and plants obtain energy by breaking down carbohydrates.  
Name this process.

\_\_\_\_\_

**[Turn over for Question 17 on Page twenty-two**

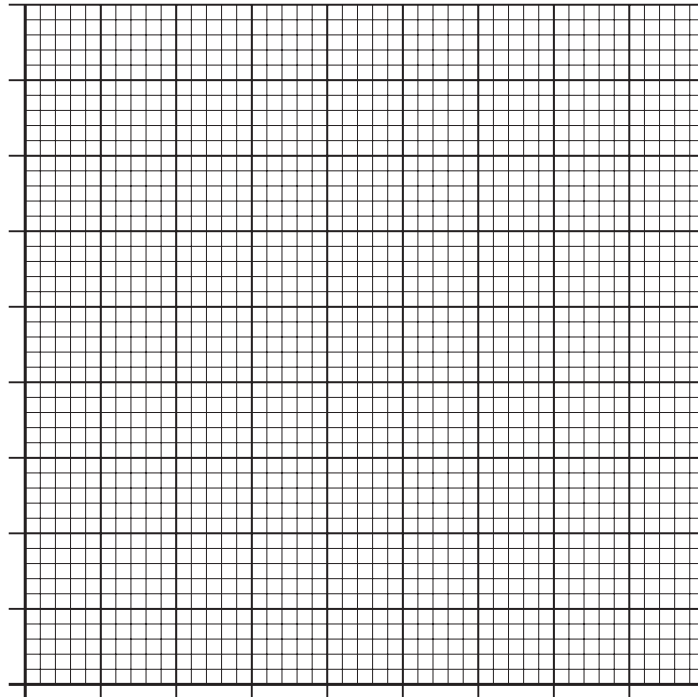


**ADDITIONAL SPACE FOR ANSWERS**

KU	PS

ADDITIONAL GRAPH PAPER FOR QUESTION 11(a)

Percentage  
%



Use

**ADDITIONAL SPACE FOR ANSWERS**

KU	PS

**ADDITIONAL SPACE FOR ANSWERS**

KU	PS

**ADDITIONAL SPACE FOR ANSWERS**

KU	PS

**ADDITIONAL SPACE FOR ANSWERS**

KU	PS

**ADDITIONAL SPACE FOR ANSWERS**

KU	PS