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Pearson Edexcel Certificate

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Chemistry

Year 9

Summer exam

Paper: 1C & 2C extracts

June 2016

Time: 45 minutes

Paper Reference

**KCH0/1C 4CH0/1C
KSC0/1C 4SC0/1C**

You must have:

Calculator

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- Show all the steps in any calculations and state the units.
- 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

- The total mark for this paper is 50.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Write your answers neatly and in good English.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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THE PERIODIC TABLE

Period 1 2 3 4 5 6 7 0

Group

Period

4	He	Helium	2
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1	H	Hydrogen	1
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1	7	Li	Lithium	3	9	Be	Beryllium	4	20	Ne	Neon	10
2	23	Na	Sodium	11	24	Mg	Magnesium	12	31	P	Phosphorus	15
3	39	K	Potassium	19	40	Ca	Calcium	20	70	Ga	Gallium	31
4	86	Rb	Rubidium	37	88	Sr	Strontium	38	115	In	Indium	49
5	133	Cs	Caesium	55	137	Ba	Barium	56	151	Eu	Euroium	63
6	223	Fr	Francium	87	226	Ra	Radium	88	201	Hg	Mercury	80
7					227	Ac	Actinium	89				

Key

Relative atomic mass
Symbol
Name
Atomic number



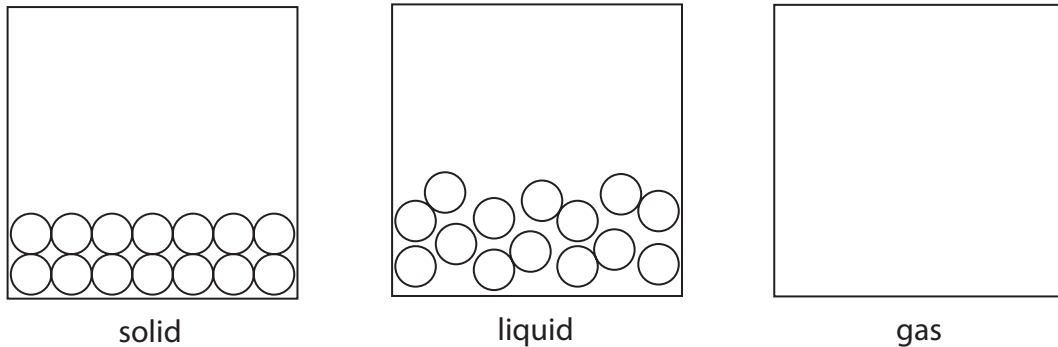
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Answer ALL questions.

1 This question is about the states of matter.

(a) The diagram shows the three states of matter for a substance.



Each circle represents a molecule of the substance.

(i) Complete the diagram by drawing six circles to represent molecules in the gas state. (1)

(ii) Which statement is correct about the movement or arrangement of the molecules of this substance? (1)

- A** They move randomly in the solid state.
- B** They move randomly in the liquid state.
- C** They are arranged in fixed positions in the liquid state.
- D** They are arranged in fixed positions in the gas state.

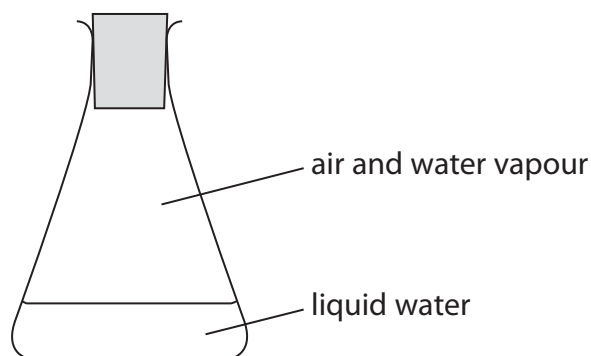
(iii) Which term is used for a solid changing to a liquid? (1)

- A** boiling
- B** condensing
- C** freezing
- D** melting



(b) Some cold water is poured into a conical flask and a bung inserted.

The diagram shows the flask after a few minutes.



(i) What is occurring in the flask?

(1)

- A boiling and condensing
- B condensing and evaporating
- C evaporating and freezing
- D freezing and melting

(ii) Which formula represents a substance that is **not** present in the flask?

(1)

- A $\text{H}_2\text{O}(\text{g})$
- B $\text{H}_2\text{O}(\text{l})$
- C $\text{N}_2(\text{g})$
- D $\text{N}_2(\text{l})$

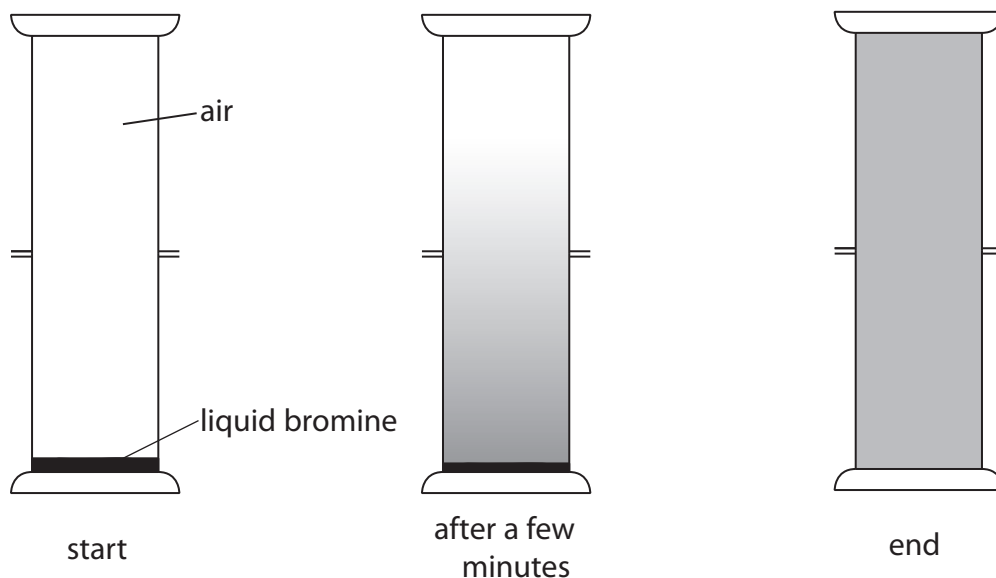
(Total for Question 1 = 5 marks)



2 A teacher demonstrates, in a fume cupboard, two experiments to show the movement of particles.

(a) In the first experiment she places some liquid bromine at the bottom of a gas jar. She then places another gas jar containing air on top of it, as shown in the diagram.

The diagram shows the apparatus at the start, after a few minutes and at the end of the experiment.



Place crosses (☒) in **two** boxes to show which statements are correct about this experiment.

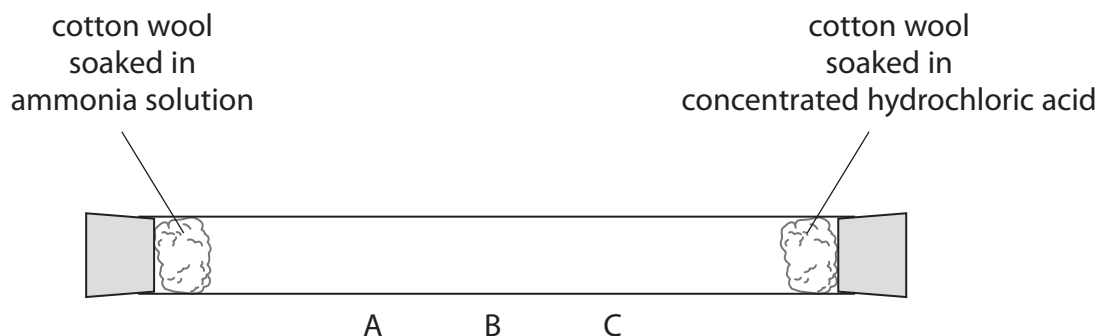
(2)

- A All the air particles in the upper gas jar stay there.
- B Bromine and air react to form bromine oxide.
- C Bromine has a darker colour than air.
- D Bromine vapour diffuses upwards.
- E Liquid bromine sublimates during the experiment.
- F The concentration of bromine in the lower gas jar does not change.



(b) In the second experiment, she soaks two pieces of cotton wool in different liquids and places them at opposite ends of a glass tube. She immediately seals the tube with bungs.

The diagram shows the apparatus at the start of the experiment.



During the experiment a white ring appears in the tube.

(i) State whether the white ring appears at A, B or C.

(1)

(ii) Explain your choice.

(2)

(Total for Question 2 = 5 marks)



Answer ALL questions.

3 The table shows the numbers of protons, neutrons and electrons in some atoms and ions.

Atom or ion	Protons	Neutrons	Electrons
P	6	8	6
Q	5	6	5
R	9	10	10
S	3	4	2
T	6	6	6

(a) (i) Which particles have the same mass?

(1)

- A** electrons and protons
- B** electrons and neutrons
- C** neutrons and protons
- D** electrons, neutrons and protons

(ii) What is the atomic number of P?

(1)

- A** 6
- B** 8
- C** 12
- D** 14

(iii) What is the mass number of Q?

(1)

- A** 5
- B** 6
- C** 10
- D** 11



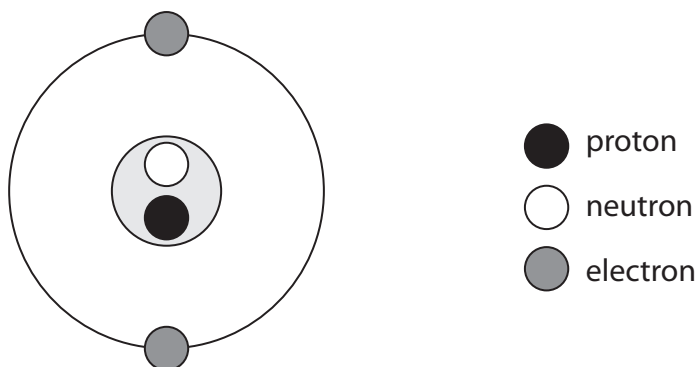
(b) Which group of the Periodic Table contains element T? (1)

(c) (i) Which two letters represent isotopes of the same element? (1)

..... and

(ii) Which letter represents a positive ion? (1)

(d) The diagram shows the arrangement of particles in another ion.



How does the diagram show that this ion has a negative charge? (1)

(Total for Question 3 = 7 marks)



4 The table shows the displayed formulae of six organic compounds, P, Q, R, S, T and U.

<p>P</p> <pre> H H-C-H H </pre>	<p>Q</p> <pre> H H H-C-C-H H H </pre>	<p>R</p> <pre> H H \ / C=C / \ H H </pre>
<p>S</p> <pre> H H H H H-C-C-C-C-H H H H H H-C-H H </pre>	<p>T</p> <pre> Br H H-C-C-H Br H </pre>	<p>U</p> <pre> H H \ / C / \ H / \ \ / \ C=C C / \ / \ H H H H </pre>

(a) (i) What is the molecular formula of compound S?

(1)

(b) (i) Give the letters of two compounds that belong to the homologous series of alkenes.

(1)

..... and

(ii) The general formula of this homologous series is

(1)



(c) Which of these conversions is an example of an addition reaction?

(1)

- A** compound P → compound Q
- B** compound Q → compound T
- C** compound R → compound Q
- D** compound R → compound U

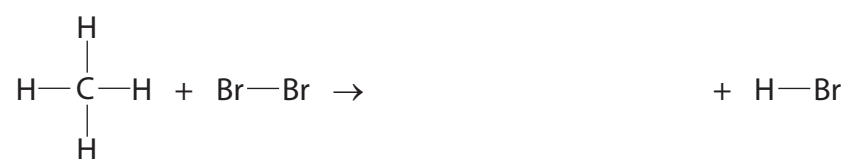
(d) Complete the table to show the displayed formula and name of the isomer of compound T.

(2)

Displayed formula	
Name	



(e) The equation represents a reaction between compound P and bromine.



(i) Complete the equation to show the displayed formula of the organic product. (1)

(ii) State the name of this organic product. (1)

(iii) State the condition used in this reaction. (1)

(iv) What term is used for this type of reaction? (1)

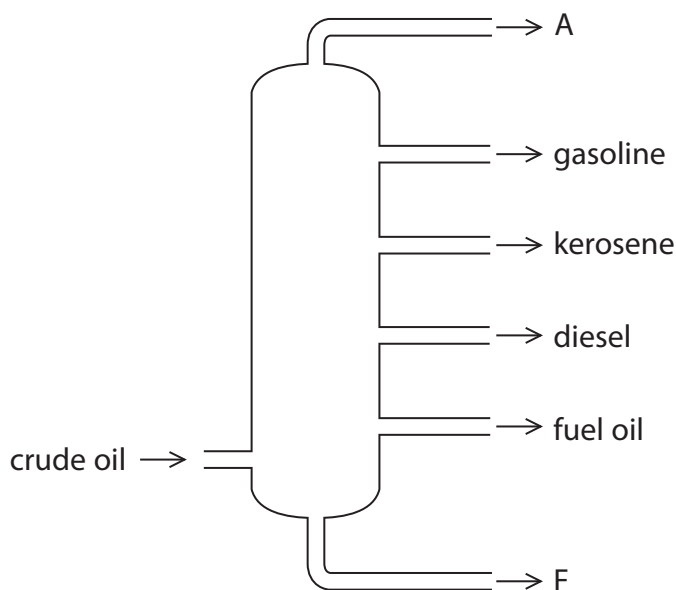
- A** addition
- B** hydration
- C** neutralisation
- D** substitution



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5 The diagram shows a typical fractionating column used to separate crude oil into fractions.



(a) The diagram shows the names of some of the fractions.

State the name of fraction A and the name of fraction F.

(2)

fraction A

fraction F

(b) Most compounds in crude oil are hydrocarbons.

State the meaning of the term **hydrocarbons**.

(2)

.....
.....



(c) Describe how the boiling point, colour and viscosity of the fuel oil fraction differ from those of the gasoline fraction.

(3)

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(d) Some fuel oil undergoes catalytic cracking. This involves the conversion of long-chain alkanes into alkenes and short-chain alkanes.

(i) A temperature of about 650°C is used in this process.

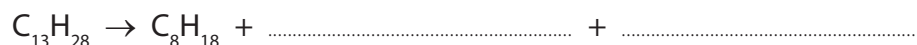
Identify a catalyst that is used.

(1)

(ii) The alkane tridecane can be cracked to produce octane and two different alkenes.

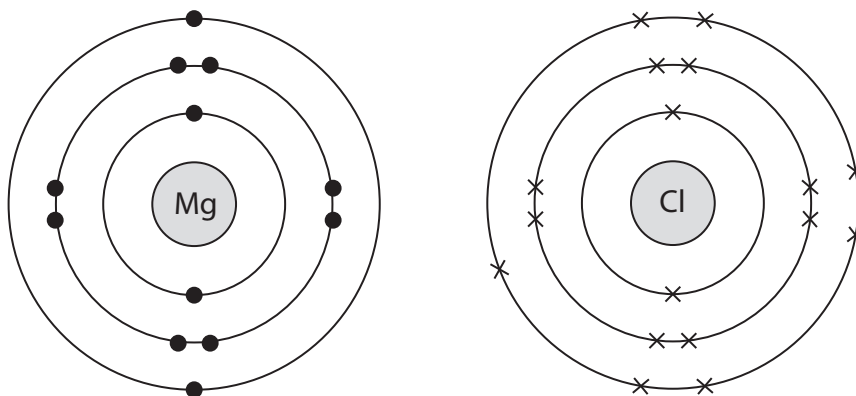
Complete the equation to show the formulae of the two alkenes.

(2)



6 (a) Magnesium chloride (MgCl_2) is an ionic compound.

The diagram shows the electronic configurations of atoms of magnesium and chlorine.



(i) Describe how magnesium atoms and chlorine atoms form magnesium ions and chloride ions.

(3)

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.....

(ii) Draw a diagram to represent the electronic configurations of each of the ions in magnesium chloride.

Show the charge on each ion.

(3)



(b) A molecule of carbon dioxide contains double covalent bonds.

Complete the diagram, using dots and crosses, to show the arrangement of the outer electrons in a molecule of carbon dioxide.



(2)

(c) Indium is a metal in Group 3 of the Periodic Table.

(i) Describe the structure and bonding in indium.

(3)

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(ii) Explain why indium is malleable.

(2)

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(Total for Question 6 = 13 marks)

