

Write your name here

Surname

Other names

Pearson Edexcel Certificate

Centre Number

Candidate Number

**Pearson Edexcel
International GCSE**

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Year 9 Chemistry

End of Year Exam Paper 1

Morning

Time: 45 minutes

Paper Reference

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

You must have:

Calculator, ruler

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 48.
- 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.
- 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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PEARSON

Answer ALL questions.

1 Substances can be elements, compounds or mixtures.

(a) Which of these is a correct symbol for an element?

(1)

- A He
- B H₂
- C H₂O
- D H₂O₂

(b) Which of these substances is a compound?

(1)

- A air
- B hydrogen
- C oxygen
- D water

(c) Which of these methods is used to obtain water from a mixture containing salt and water?

(1)

- A crystallisation
- B filtration
- C simple distillation
- D titration

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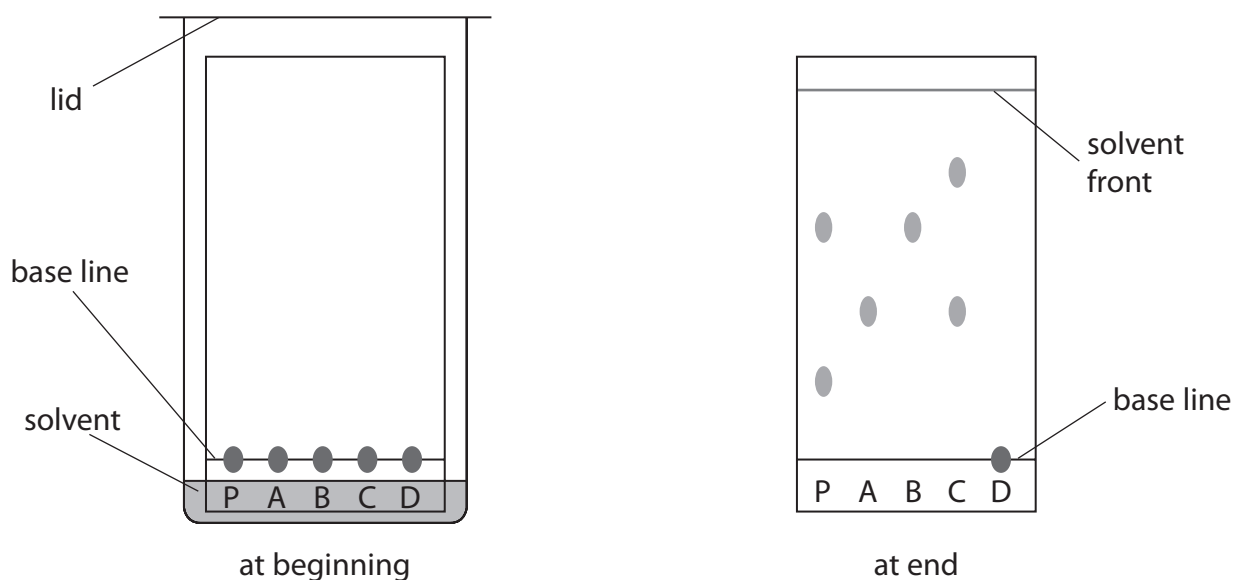


(d) Paper chromatography is used to separate the dyes present in some inks.

A sample of ink, P, is spotted on to some chromatography paper.

Four known inks, A, B, C and D, are also spotted on to the same paper.

The diagram shows how the experiment is set up and the paper at the end of the experiment.



(i) State why the solvent level should not be above the base line at the start of the experiment.

(1)

(ii) Explain which dye, present in one of the inks A, B, C or D, is also present in ink P.

(2)

(iii) State why ink D does not move during the experiment.

(1)



(iv) Dyes have an R_f value that can be calculated using this expression.

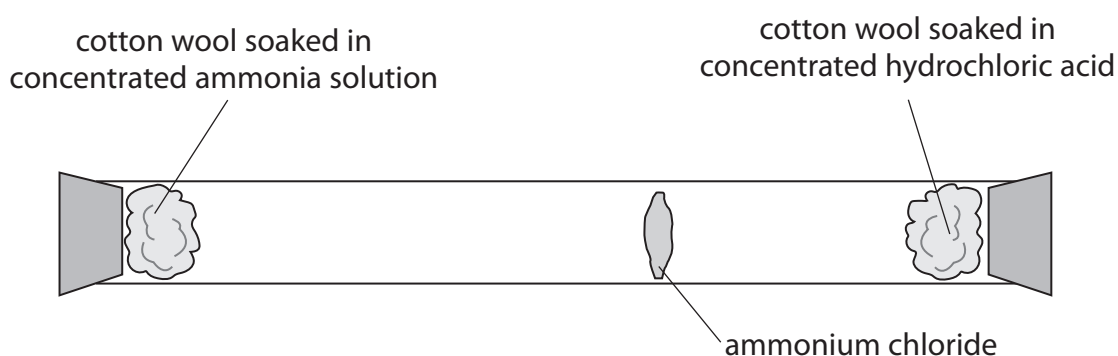
$$R_f = \frac{\text{distance moved by dye}}{\text{distance moved by solvent}}$$

Complete the table for the dye in ink A.

(2)

distance moved by dye in ink A in mm	
distance moved by solvent in mm	49
R_f value of dye in ink A	

(e) The diagram shows an experiment to demonstrate diffusion.

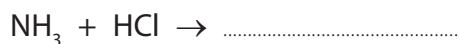


(i) The word equation for the reaction that occurs in this experiment is



Complete the chemical equation for this reaction.

(1)



(ii) Draw a circle around each of the two state symbols that could be included in the chemical equation in part (e)(i).

(1)

s l g aq

(Total for Question 1 = 11 marks)

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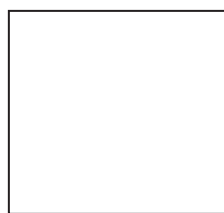
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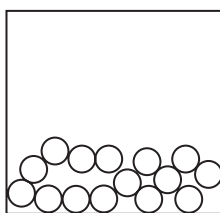


2 The diagram shows the arrangement of the molecules in two of the three states of water.

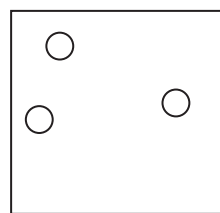
Each circle represents a molecule of water.



solid



liquid



gas

(a) Complete the diagram to show how the molecules of water are arranged in the solid state.

(1)

(b) Which row of the table correctly describes the arrangement and movement of molecules of water in the solid state?

(1)

	Arrangement	Movement
<input type="checkbox"/> A	regular	moving freely
<input type="checkbox"/> B	random	moving freely
<input type="checkbox"/> C	regular	vibrating
<input type="checkbox"/> D	random	vibrating

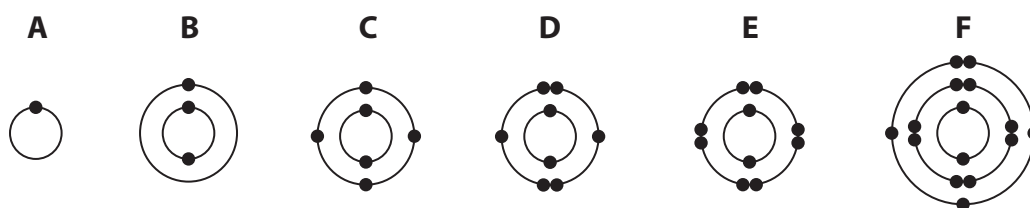
(c) Which word describes water changing from a liquid to a solid?

(1)

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



4 The diagram shows the electronic configurations of six different atoms.



(a) You may use the Periodic Table on page 2 to help you answer this question. Answer each part by writing one of the letters A, B, C, D, E or F in the box provided.

You may use each letter once, more than once or not at all.

Give the letter that represents an atom

(6)

(i) of a noble gas

(ii) that contains three protons

(iii) of phosphorus

(iv) of an element in Group 4 of the Periodic Table

(v) of an element in Period 3 of the Periodic Table

(vi) with a full outer shell of electrons

(b) Atoms of A and D combine to form a compound containing covalent bonds.

(i) Complete the sentence to describe a covalent bond.

(2)

A covalent bond is the electrostatic attraction between a pair of

and the of two atoms.

(ii) Suggest, with reference to electronic configurations, the most likely formula of the compound formed between atoms of A and D.

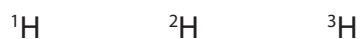
(1)

(Total for Question 4 = 9 marks)



6

(b) The symbols for the three isotopes of hydrogen are



(i) State what is meant by the term **isotopes**. (2)

.....

.....

.....

.....

(ii) Complete the table to show the number of protons, neutrons and electrons in each of the three isotopes of hydrogen. (3)

	Isotope		
	${}^1\text{H}$	${}^2\text{H}$	${}^3\text{H}$
number of protons			
number of neutrons			
number of electrons			

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10 This question is about hydrochloric acid.

(a) Dilute hydrochloric acid, $\text{HCl}(\text{aq})$, reacts with many metals.

A student observes the reaction of dilute hydrochloric acid with four metals, P, Q, R and S. She uses the same amount of metal in each case.

The table shows her observations.

Metal	Observations
P	very few bubbles produced very slowly
Q	many bubbles produced very quickly
R	many bubbles produced quickly
S	few bubbles produced slowly

(i) Use the information in the table to place the four metals in order of reactivity.

Place the most reactive first.

(2)

most reactive

least reactive

(ii) Give the names of the two products formed when magnesium reacts with dilute hydrochloric acid.

(2)

Product 1

Product 2



11 The table shows the displayed formulae of four hydrocarbons, W, X, Y and Z.

W	X
<pre> H H H H-C-C-C-H H H H </pre>	<pre> H H H H H-C-C-C-C-H H H H H </pre>
Y	Z
<pre> H H-C-H H H H-C-C-C-H H H H </pre>	<pre> H H \ / C / \ H C H \ / \ / C=C / \ \ / H H H </pre>

(a) Give the name of hydrocarbon W.

(1)

(b) Give the molecular formula for hydrocarbon X.

(1)

(c) Which of the hydrocarbons belong to the same homologous series of compounds?

(1)

(d) Give the empirical formula of hydrocarbon Z.

(1)

(e) Z is an unsaturated hydrocarbon.

Explain what is meant by the term **unsaturated hydrocarbon**.

(3)

unsaturated

hydrocarbon



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- (f) (i) The substitution reaction between W and bromine is similar to the reaction between methane and bromine.

Suggest the displayed formula for a possible product of the reaction between W and bromine.

(1)

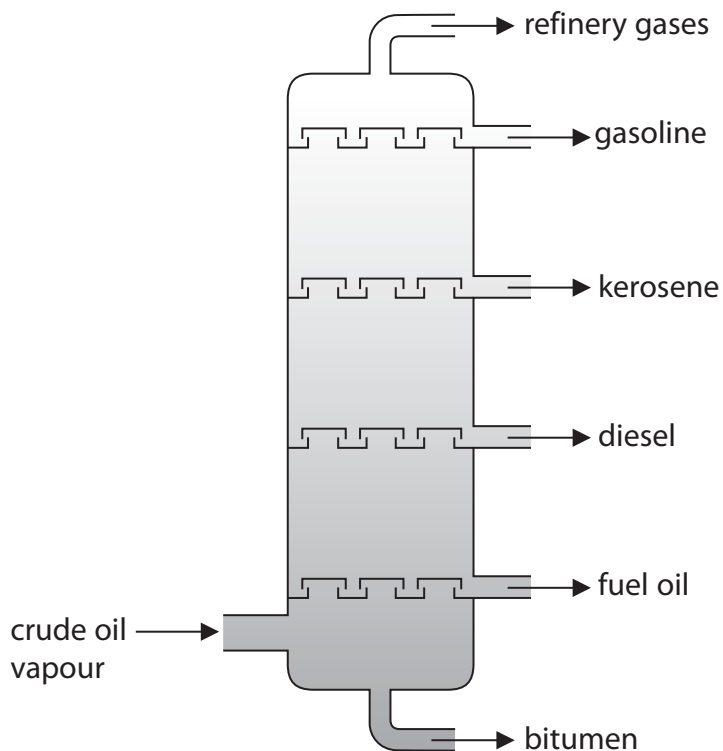
- (ii) State the condition required for this reaction to take place.

(1)

(Total for Question 11 = 9 marks)



- 7 Crude oil is a complex mixture of organic compounds called hydrocarbons. It is separated into fractions using a fractionating tower.



- (a) Which fraction has the lowest boiling point?

(1)

- (b) Which fraction is the most viscous?

(1)

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- (c) (i) Some fractions containing long-chain hydrocarbons are cracked. The cracking of octadecane, (C₁₈H₃₈), produces octane, (C₈H₁₈), and one other product.

Write a chemical equation for this cracking reaction.

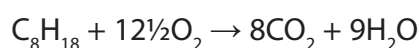
(1)

- (ii) Explain why it is important to crack long-chain hydrocarbon fractions.

(2)

- (d) Octane is one of the hydrocarbons in the petrol used in cars.

The equation for the complete combustion of octane is



The incomplete combustion of octane produces a poisonous gas that reduces the capacity of blood to carry oxygen.

Write a chemical equation for this incomplete combustion of octane.

(2)

(Total for Question 7 = 7 marks)

