

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Centre Number

Candidate Number

**Pearson Edexcel
International GCSE (9–1)**

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Sample Assessment Materials for first teaching September 2017

(Time: 1 hour 10 minutes)

Paper Reference **4SS0/1C**

Science (Single Award)

Chemistry

Unit: 4SS0

Paper: 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.*
- 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

- The total mark for this paper is 60.
- 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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The Periodic Table of the Elements

	1	2	3	4	5	6	7	0										
	7 Li lithium 3	9 Be beryllium 4	11 Na sodium 11	12 Mg magnesium 12	13 Al aluminium 13	14 N nitrogen 7	15 P phosphorus 15	16 O oxygen 8	17 F fluorine 9	18 Ne neon 10								
	19 K potassium 19	20 Ca calcium 20	21 Sc scandium	22 Ti titanium 22	23 V vanadium 23	24 Cr chromium 24	25 Mn manganese 25	26 Fe iron 26	27 Co cobalt 27	28 Ni nickel 28	29 Cu copper 29	30 Zn zinc 30	31 Ga gallium 31	32 Ge germanium 32	33 As arsenic 33	34 Se selenium 34	35 Br bromine 35	36 Kr krypton 36
	37 Rb rubidium 37	38 Sr strontium 38	39 Y yttrium 39	40 Zr zirconium 40	41 Nb niobium 41	42 Mo molybdenum 42	43 Tc technetium [98]	44 Ru ruthenium 44	45 Rh rhodium 45	46 Pd palladium 46	47 Ag silver 47	48 Cd cadmium 48	49 In indium 49	50 Sn tin 50	51 Sb antimony 51	52 Te tellurium 52	53 I iodine 53	54 Xe xenon 54
	55 Cs caesium 55	56 Ba barium 56	57 La* lanthanum 57	72 Hf hafnium 72	73 Ta tantalum 73	74 W tungsten 74	75 Re rhenium 75	76 Os osmium 76	77 Ir iridium 77	78 Pt platinum 78	79 Au gold 79	80 Hg mercury 80	81 Tl thallium 81	82 Pb lead 82	83 Bi bismuth 83	84 Po polonium 84	85 At astatine 85	86 Rn radon 86
	[223] Fr francium 87	[226] Ra radium 88	[227] Ac* actinium 89	[261] Rf rutherfordium 104	[262] Db dubnium 105	[266] Sg seaborgium 106	[264] Bh bohrium 107	[277] Hs hassium 108	[268] Mt meitnerium 109	[271] Ds darmstadtium 110	[272] Rg roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

1	H	hydrogen	1
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relative atomic mass
atomic symbol
name
atomic (proton) number

* The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.
The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.

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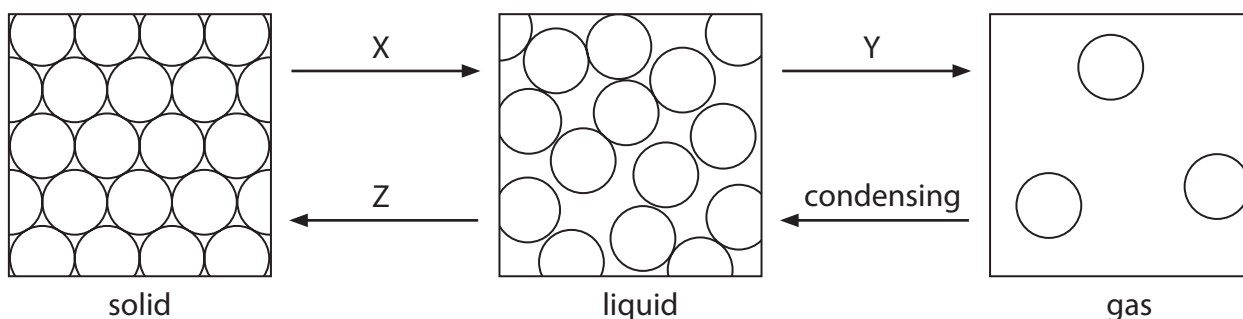
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Answer ALL questions. Write your answers in the spaces provided.

- 1 The diagram shows the arrangement of particles in three states of matter. Each circle represents a particle.



- (a) Use words from the box to show the changes of state labelled X, Y and Z. You may use each word once, more than once or not at all.

(3)

boiling crystallising diffusing freezing melting

X

Y

Z

- (b) Which statement best describes the movement of the particles in a solid?

(1)

- A the particles vibrate about their fixed positions
- B the particles move randomly at high speeds
- C the particles slide past one another
- D the particles do not move at all



(c) The term sublimation is also used for a change of state.

Sublimation is the change of state from

(1)

- A gas to liquid
- B liquid to gas
- C solid to liquid
- D solid to gas

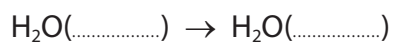
(d) Heat energy is taken in from the surroundings when a solid changes into a liquid.

(i) Give the term used to describe this type of heat energy change.

(1)

(ii) Complete the equation for ice changing into water by adding the correct state symbols.

(1)



(Total for Question 1 = 7 marks)

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2 Ammonium chloride is an ionic compound.

(a) Give the formula of each ion in ammonium chloride.

(2)

..... and

(b) Ammonium chloride reacts with sodium hydroxide to form ammonia gas.

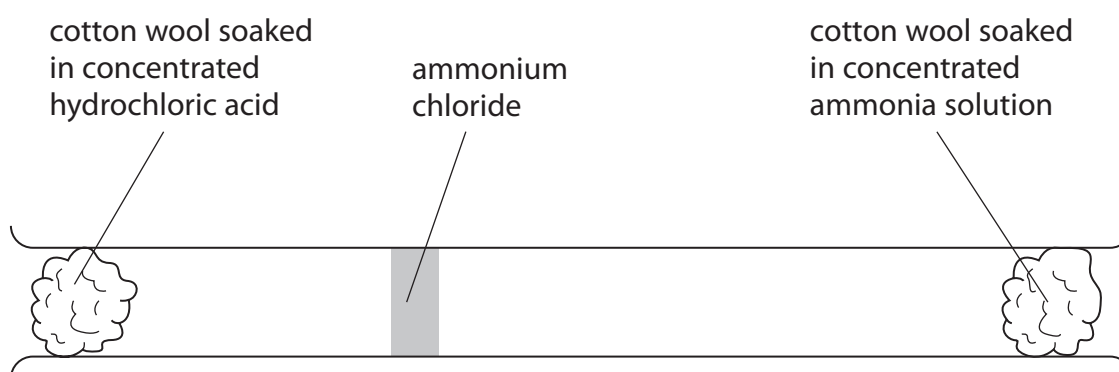
Describe a test for ammonia gas.

(2)

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.....
.....

(c) Ammonium chloride is formed when hydrogen chloride gas reacts with ammonia gas.

The diagram shows apparatus used to show the diffusion of these two gases.



Concentrated hydrochloric acid produces hydrogen chloride gas.

Concentrated ammonia solution produces ammonia gas.

(i) Explain how the diagram compares the rate of diffusion of each gas.

(2)

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(ii) State the main hazard when using concentrated hydrochloric acid.

(1)

(iii) State one precaution you could take to reduce this hazard.

(1)

(d) Ammonium chloride dissolves in water to form a weakly acidic solution.

(i) Describe how you would use universal indicator solution to measure the pH of a solution of ammonium chloride in water.

(2)

(ii) Suggest a value for the pH of this solution.

(1)

(Total for Question 2 = 11 marks)



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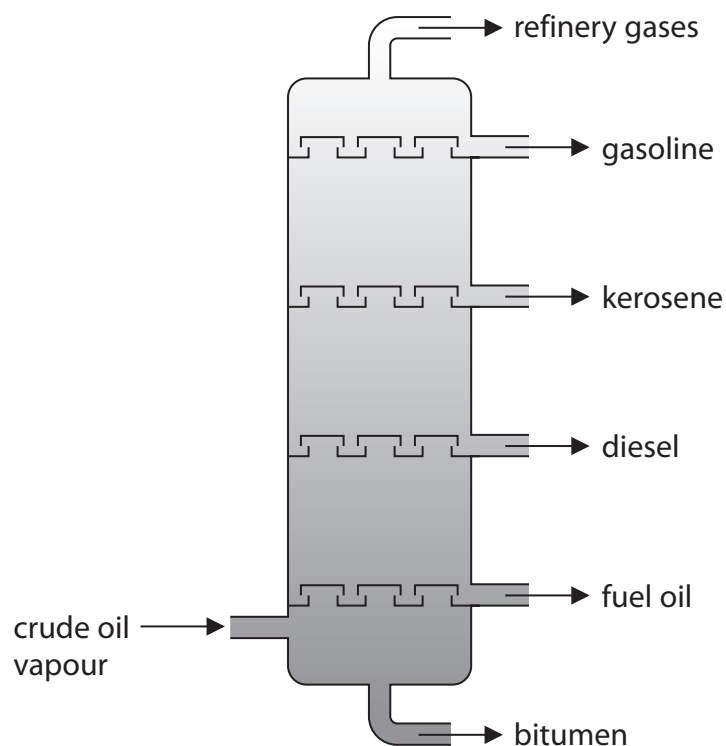
3 Crude oil is a mixture of organic compounds called hydrocarbons.

(a) Name the two elements in hydrocarbons.

(2)

..... and

(b) Crude oil is separated into fractions using a fractionating column.



(i) Name the fraction with the highest boiling point.

(1)

(ii) Name the fraction with the darkest colour.

(1)

(c) Give a use for the kerosene fraction and for the fuel oil fraction.

(2)

kerosene

fuel oil

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(d) Gasoline is used to make petrol for use as a fuel in cars.

(i) State the meaning of the term **fuel**. (1)

.....
.....

(ii) Name the two products of the complete combustion of petrol. (2)

1
2

(iii) Explain why the **incomplete** combustion of petrol can be harmful to humans. (2)

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(Total for Question 3 = 11 marks)

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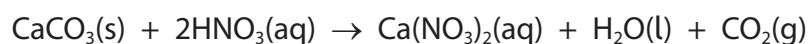
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- 4 A student investigates the effect of changing the temperature on the rate of reaction between calcium carbonate and nitric acid.

The equation for the reaction is



He uses this method.

- use a measuring cylinder to pour 50 cm³ of dilute nitric acid into a conical flask
- heat the acid to the required temperature
- place the flask on a balance
- add 10 g (an excess) of calcium carbonate chips to the flask
- record the time it takes for the mass to decrease by 1.0 g

He repeats the experiment at different temperatures.

The table shows his results.

Temperature of acid in °C	Time for mass to decrease by 1.0 g in s
21	94
32	63
46	41
57	36
64	28
77	23

- (a) (i) Plot the points on the grid. (1)
- (ii) Draw a circle around the point that represents an anomalous result. (1)
- (iii) Draw a curve of best fit. (1)
- (iv) The student did **not** make a mistake in reading the stopwatch.
Suggest a possible cause for the anomalous result. (1)



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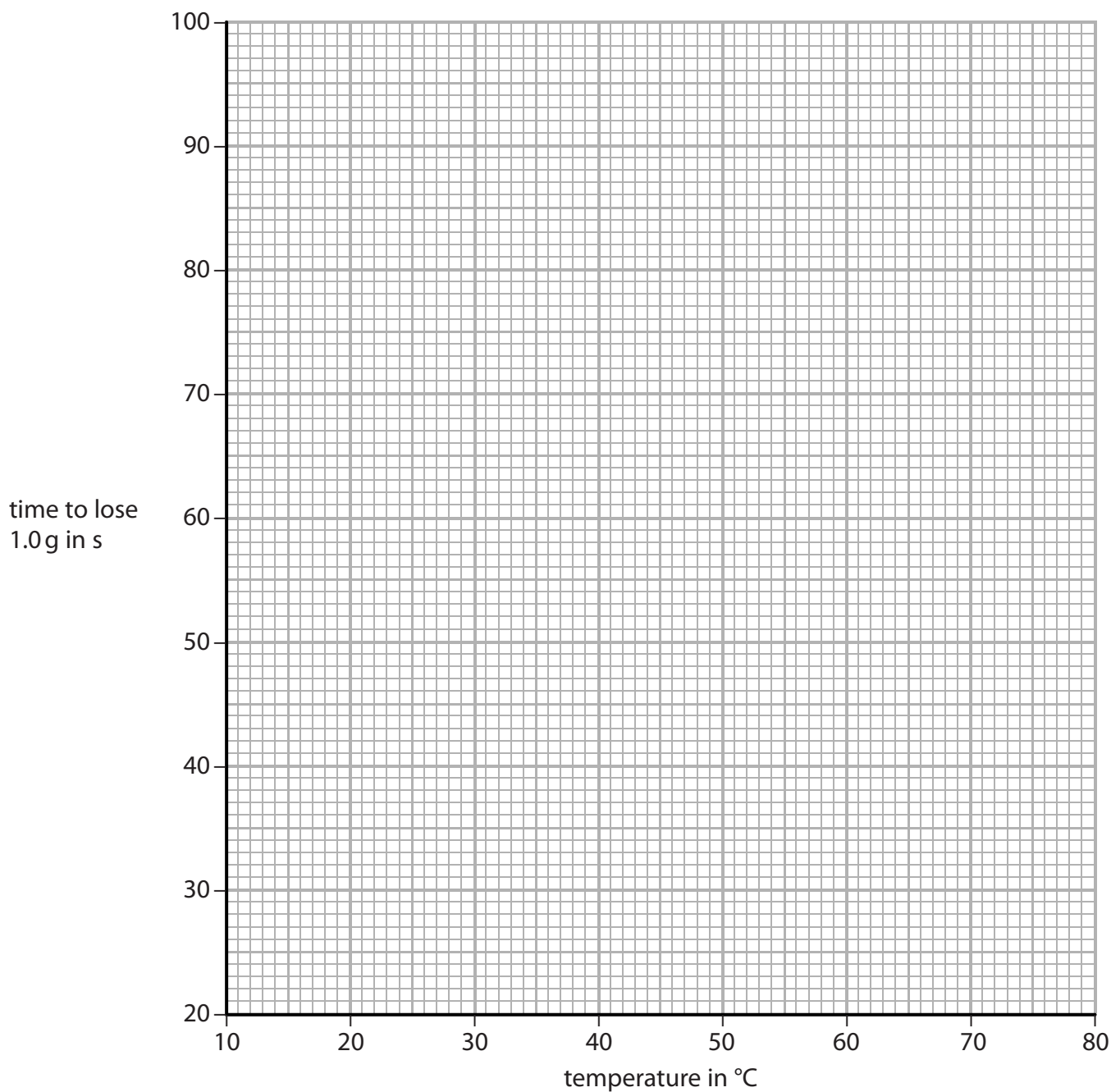
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(b) Use your graph to determine the time taken to lose 1.0 g at 40°C.

Show on the graph how you obtained your answer.

(2)

time = s



(c) The rate of reaction can be calculated using

$$\text{rate of reaction} = \frac{\text{mass lost}}{\text{time taken to lose this mass}}$$

Use your answer to part (b) to calculate the rate of reaction at 40 °C.

Include a unit in your answer.

(3)

rate = unit

(d) State the relationship between the rate of reaction and the temperature.

(1)

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(e) Explain how insulating the conical flask before adding the calcium carbonate would give more accurate results.

(2)

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(Total for Question 4 = 12 marks)

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5 The table gives some information about three elements in Group 7 of the Periodic Table.

Name	State at room temperature	Colour	Boiling point in °C
chlorine	gas	pale green	-35
bromine	liquid	red-brown	
iodine	solid	dark grey	184

(a) Use information from the table to predict the boiling point of bromine.

(1)

boiling point =°C

(b) Astatine is the element below iodine in Group 7.

Predict the state at room temperature and the colour of astatine.

(2)

state

colour

(c) (i) Chlorine reacts with hydrogen to form hydrogen chloride, HCl

Write a chemical equation for this reaction.

(1)

(ii) An aqueous solution of hydrogen chloride turns universal indicator red.

Suggest a value for the pH of this solution.

(1)

pH =

(iii) An aqueous solution of hydrogen chloride reacts with aqueous sodium hydroxide to form sodium chloride and water.

State the name given to this type of reaction.

(1)

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(d) The table gives some information about sodium chloride and hydrogen chloride.

	Formula	Structure	Type of bonding	Melting point in °C
sodium chloride	NaCl	giant	ionic	801
hydrogen chloride	HCl	simple molecular	covalent	- 114

Explain why the melting points of sodium chloride and hydrogen chloride are very different.

(4)

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(Total for Question 5 = 10 marks)

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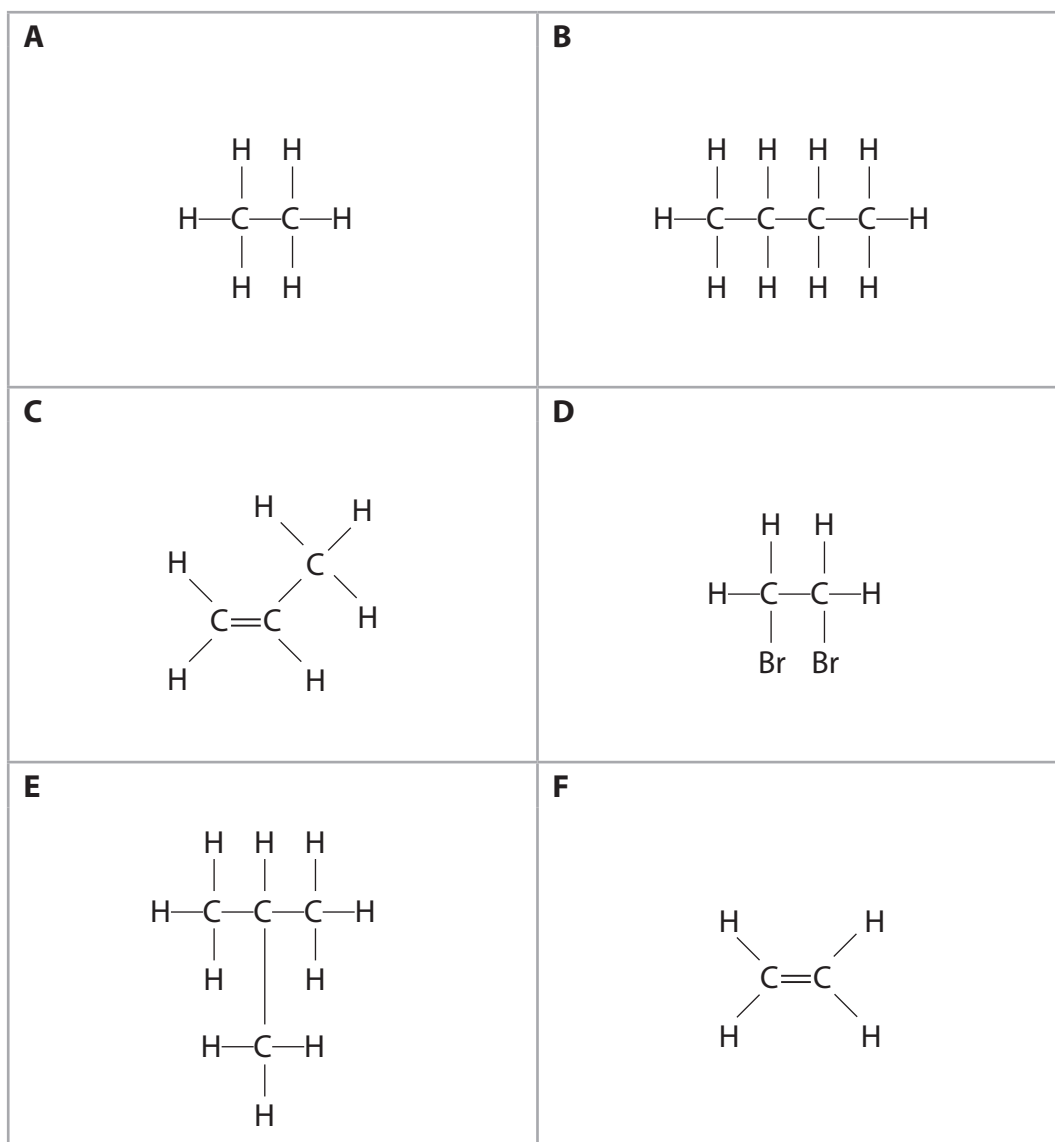
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6 The diagram shows the displayed formulae of six organic compounds.



(a) State why compound C is an unsaturated compound.

(1)

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(b) Describe how bromine water can be used to distinguish between compound A and compound F.

(2)

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(c) Show that compound E is an alkane.

(2)

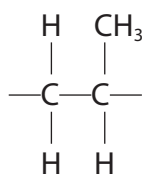
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(d) The repeat unit of an addition polymer is



Give the letter of the compound in the table that is used to make this polymer.

(1)

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(e) Addition polymers can be disposed of in landfill sites (buried underground) or by burning.

Explain the problems caused by each of these methods of disposal.

(3)

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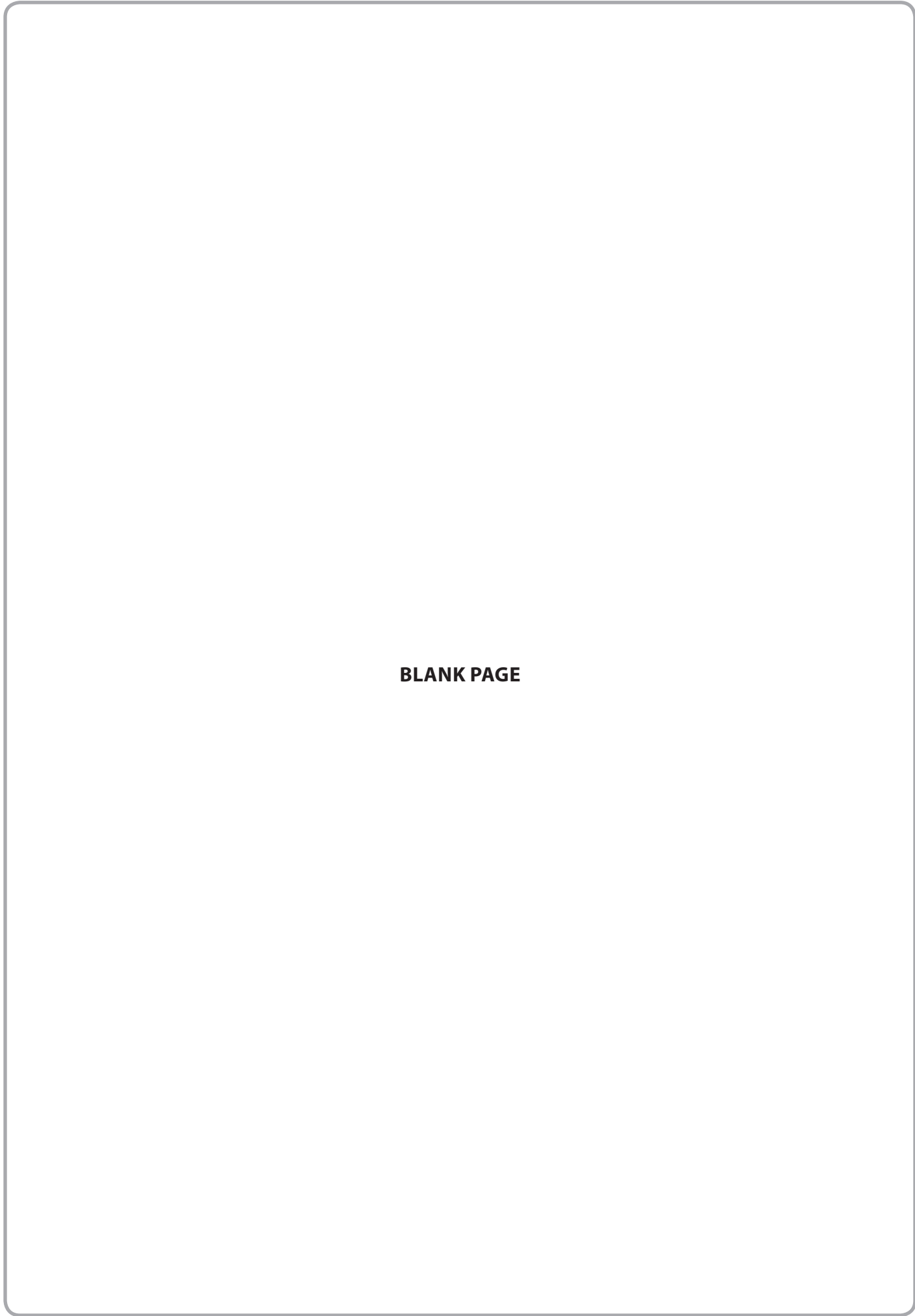
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(Total for Question 6 = 9 marks)

TOTAL FOR PAPER = 60 MARKS





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