

Write your name here	
Surname	Other names
Centre Number	Candidate Number
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Edexcel GCSE	
Chemistry/Science	
Unit C1: Chemistry in Our World	
Higher Tier	
Thursday 23 May 2013 – Morning Time: 1 hour	Paper Reference 5CH1H/01
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.*

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.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
– *you should take particular care with your spelling, punctuation and grammar, as well as the clarity of expression, on these questions.*

Advice

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

Turn over ►

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PEARSON

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 43	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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Questions begin on next page



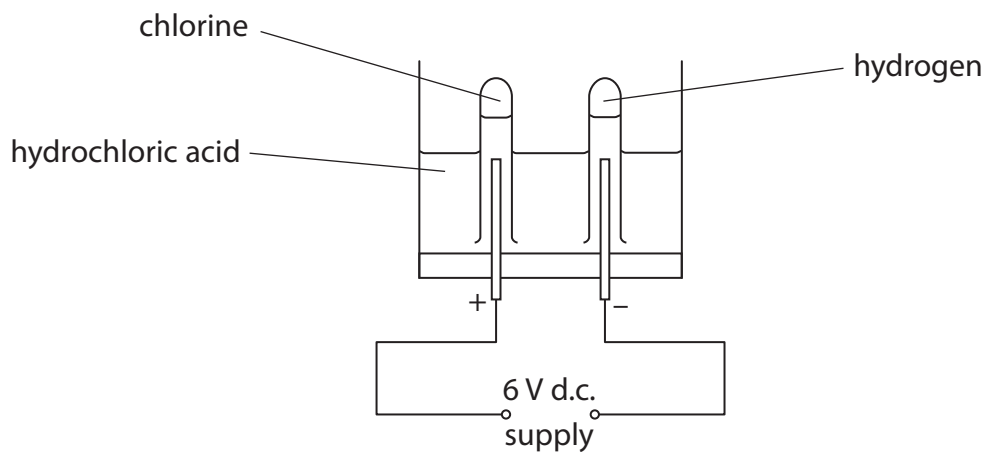
Answer ALL questions.

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 ☒.

Hydrochloric acid

- 1 (a) Electrolysis of hydrochloric acid produces chlorine and hydrogen.

The apparatus used is shown.



- (i) Explain what is meant by **electrolysis**.

(2)

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- (ii) Describe the test to show that a gas is chlorine.

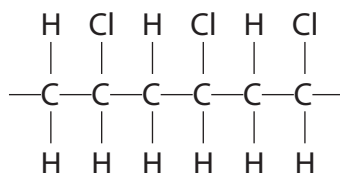
(2)

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- (iii) Chlorine is used in the manufacture of a polymer.
Part of this polymer molecule is



State the name of the polymer.

(1)

.....



(b) Dilute hydrochloric acid reacts with silver nitrate solution to form silver chloride and nitric acid.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The reaction produces silver chloride as a precipitate.

In an equation this would be shown as

(1)

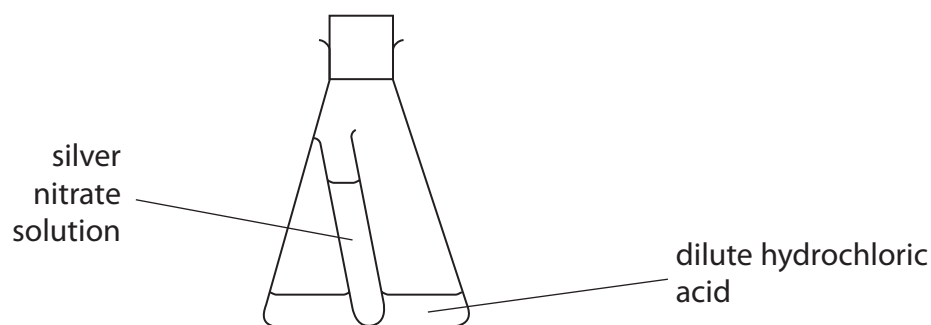
A AgCl(aq)

B AgCl(g)

C AgCl(l)

D AgCl(s)

(ii) This apparatus is used to investigate the mass of the reactants and the mass of products in this reaction.



The total mass of this apparatus was measured.

The flask was shaken to allow the silver nitrate solution and dilute hydrochloric acid to react.

After the reaction the total mass of the apparatus was measured again.

State how the total mass of the apparatus after the reaction will compare with the total mass of the apparatus before the reaction.

(1)

(iii) Write the balanced equation for the reaction of silver nitrate solution, AgNO_3 , with dilute hydrochloric acid to form silver chloride, AgCl , and nitric acid.

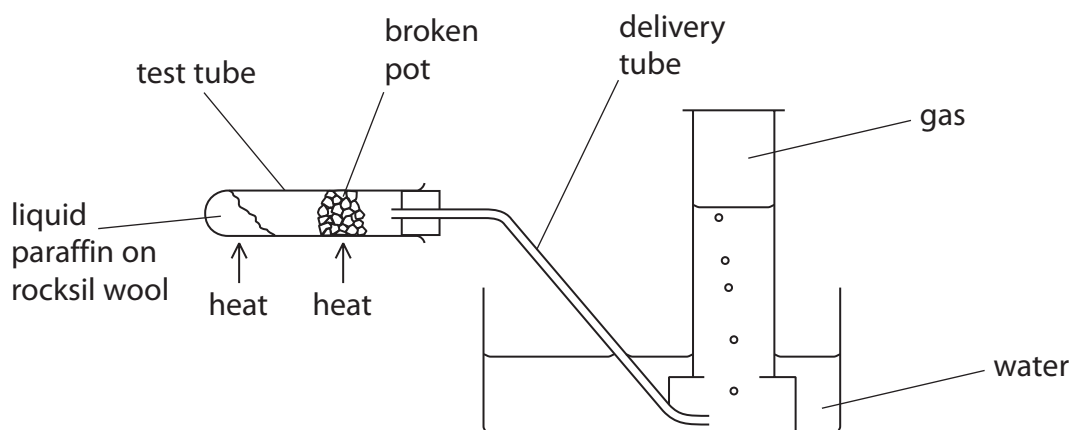
(2)

(Total for Question 1 = 9 marks)



Cracking

- 2 (a) In the laboratory this apparatus is used to crack long chain hydrocarbon molecules to form shorter chain hydrocarbon molecules.



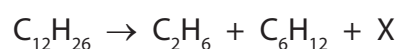
When the experiment is complete there is a danger that water will rise up the delivery tube into the hot test tube.

State what you would do to prevent this.

(1)

- (b) Complete the sentence by putting a cross (☒) in the box next to your answer.

The equation for a reaction that occurs during cracking is



In the balanced equation, X is

(1)

- A C_3H_8
- B C_4H_8
- C C_4H_{10}
- D C_6H_{14}

- (c) Alkenes are unsaturated hydrocarbons.

State what is meant by **unsaturated**.

(1)



(d) Propane and propene are bubbled through separate samples of bromine water.

Describe what you would **see** in these tests.

(3)

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(e) In industry, long chain hydrocarbon molecules are cracked to form shorter chain hydrocarbon molecules.

Explain why this process is important.

(2)

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(Total for Question 2 = 8 marks)





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Gases in our atmosphere

3 (a) Complete the sentence by putting a cross (☒) in the box next to your answer.

(i) The percentage of carbon dioxide in the Earth's atmosphere today is

(1)

A greater than 5%

B 4%

C 3%

D less than 0.5%

(ii) The percentage of carbon dioxide in the Earth's atmosphere today is less than that in the Earth's earliest atmosphere.

Explain what has caused the percentage of carbon dioxide to decrease.

(2)

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(iii) Carbon dioxide and other gases in the atmosphere help to keep the Earth warm.

State how these gases keep the Earth warm.

(1)

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(b) Describe the test to show that a gas is oxygen.

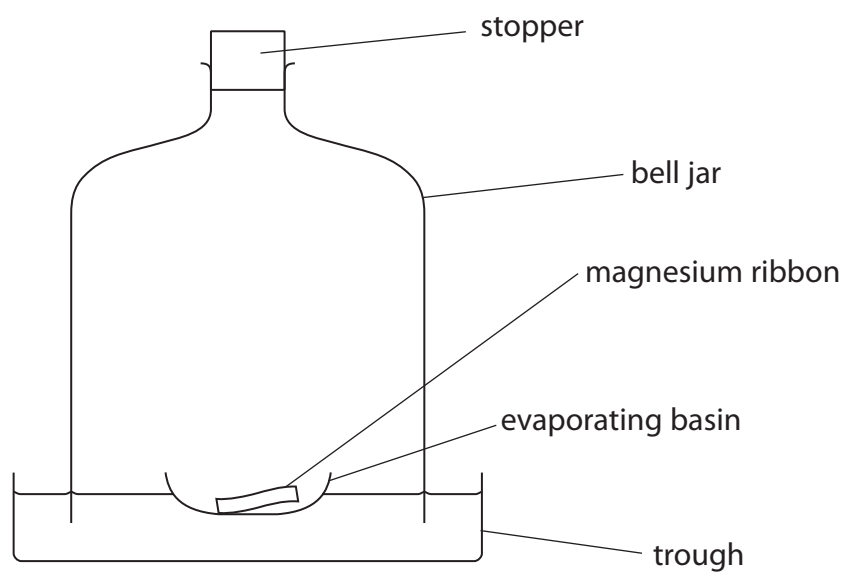
(2)

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- (c) Magnesium reacts with oxygen to form magnesium oxide.
An excess of magnesium ribbon was placed in an evaporating basin that was floated on water in a trough.
The magnesium ribbon was lit.
A bell jar was placed over the evaporating basin and the stopper inserted to seal the experiment.



When the magnesium flame went out, there was some magnesium left in the basin.
When the apparatus had cooled, the water in the bell jar had risen.

- (i) Explain why the water level had risen.

(2)

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- (ii) At the start of the experiment, the volume of the air in the bell jar was 1000 cm^3 .
Assume that 21% of the air by volume is oxygen.
Calculate the volume of gas that was present in the bell jar at the end of the experiment.

(2)

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volume of gas = cm^3

- (d) Metal oxides react with acids to produce salts and water.
Dilute sulfuric acid was added to magnesium oxide.
State the name of the salt formed.

(1)

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(Total for Question 3 = 11 marks)



Aluminium

- 4 (a) Drinks are often sold in cans.
These cans are made either of aluminium or of steel coated with tin.
The table gives information about these three metallic substances.

metal	cost of 1 kg / £	amount in Earth's crust / %
aluminium	1.31	8
steel (iron)	0.32	5
tin	12.6	0.0002

Use the table to give **two** reasons why it could be more important to recycle tin than to recycle aluminium or steel.

(2)

reason 1

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.....

reason 2

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.....

- (b) Complete the sentence by putting a cross (☒) in the box next to your answer.

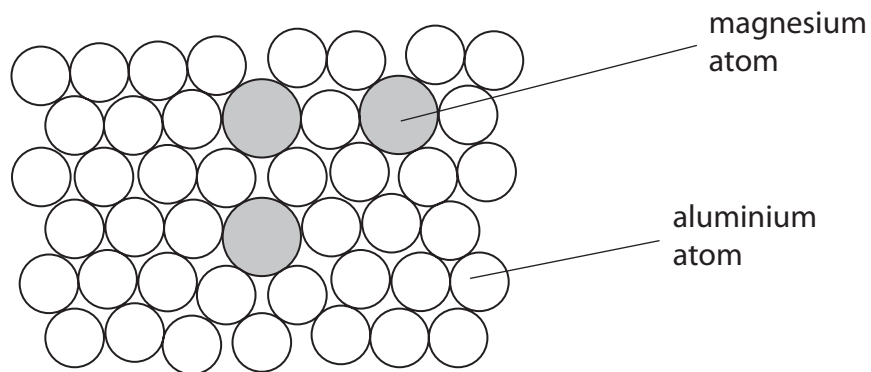
The reaction for the extraction of aluminium from its ore involves

(1)

- A** heating with carbon
- B** thermal decomposition
- C** reduction
- D** neutralisation



(c) Magnalium is an alloy of aluminium and magnesium.
The diagram shows the structure of this alloy.



(i) Explain what you understand by the term **alloy**.

(2)

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(ii) Explain, in terms of their structures, why magnalium is stronger than pure aluminium.

(3)

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(Total for Question 4 = 8 marks)



Rocks

- 5 (a) Limestone is a natural form of calcium carbonate.

Explain why calcium carbonate can be used to treat waste gases produced in coal-fired power stations.

(3)

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- (b) If calcium carbonate is heated strongly it decomposes to calcium oxide and carbon dioxide.

Write the balanced equation for this reaction.

(2)

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- (c) A few drops of cold water are added to a lump of calcium oxide.

Which of the following is **not** a correct statement about this reaction?

Put a cross (☒) in the box next to your answer.

(1)

- A** steam is formed
- B** a white powder is produced
- C** the lump of calcium oxide cools down
- D** calcium hydroxide is formed

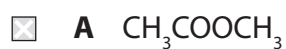


Carbon compounds

6 (a) Which of these is the formula of a molecule of a hydrocarbon?

Put a cross (☒) in the box next to your answer.

(1)



(b) The formula of a molecule of propene is C_3H_6 .

Draw the structure of a molecule of propene, showing all covalent bonds.

(2)

(c) Methane burns in oxygen to form carbon dioxide and water.

Write the balanced equation for this reaction.

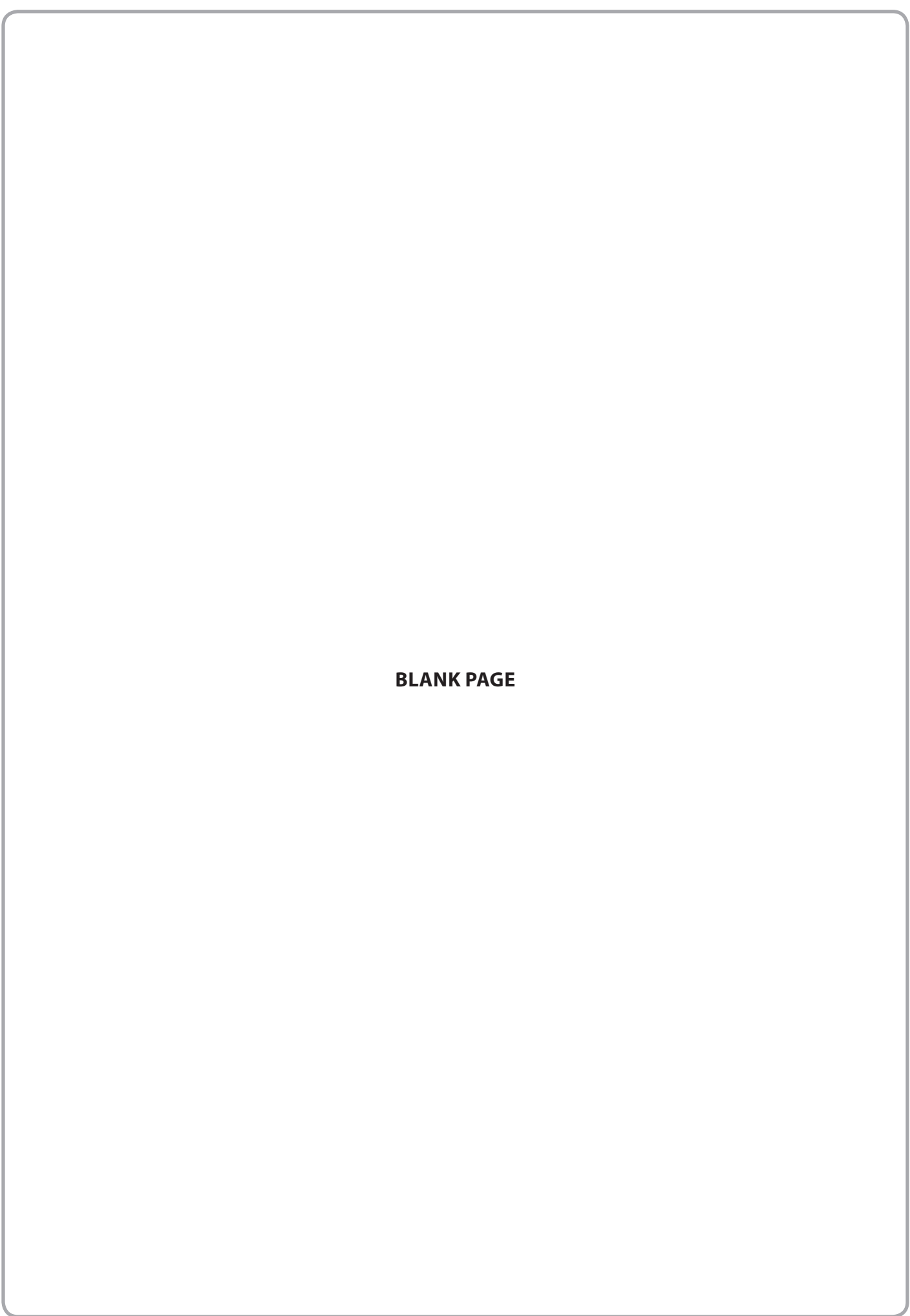
(3)





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