Paper Reference(s) 9CH0/01

Pearson Edexcel Level 3 GCE

Chemistry

Advanced

PAPER 1: Advanced Inorganic and Physical Chemistry

Tuesday 10 June 2025 – Morning

Time: 1 hour 45 minutes

Diagram Booklet

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INSTRUCTIONS

There may be spare copies of some diagrams.

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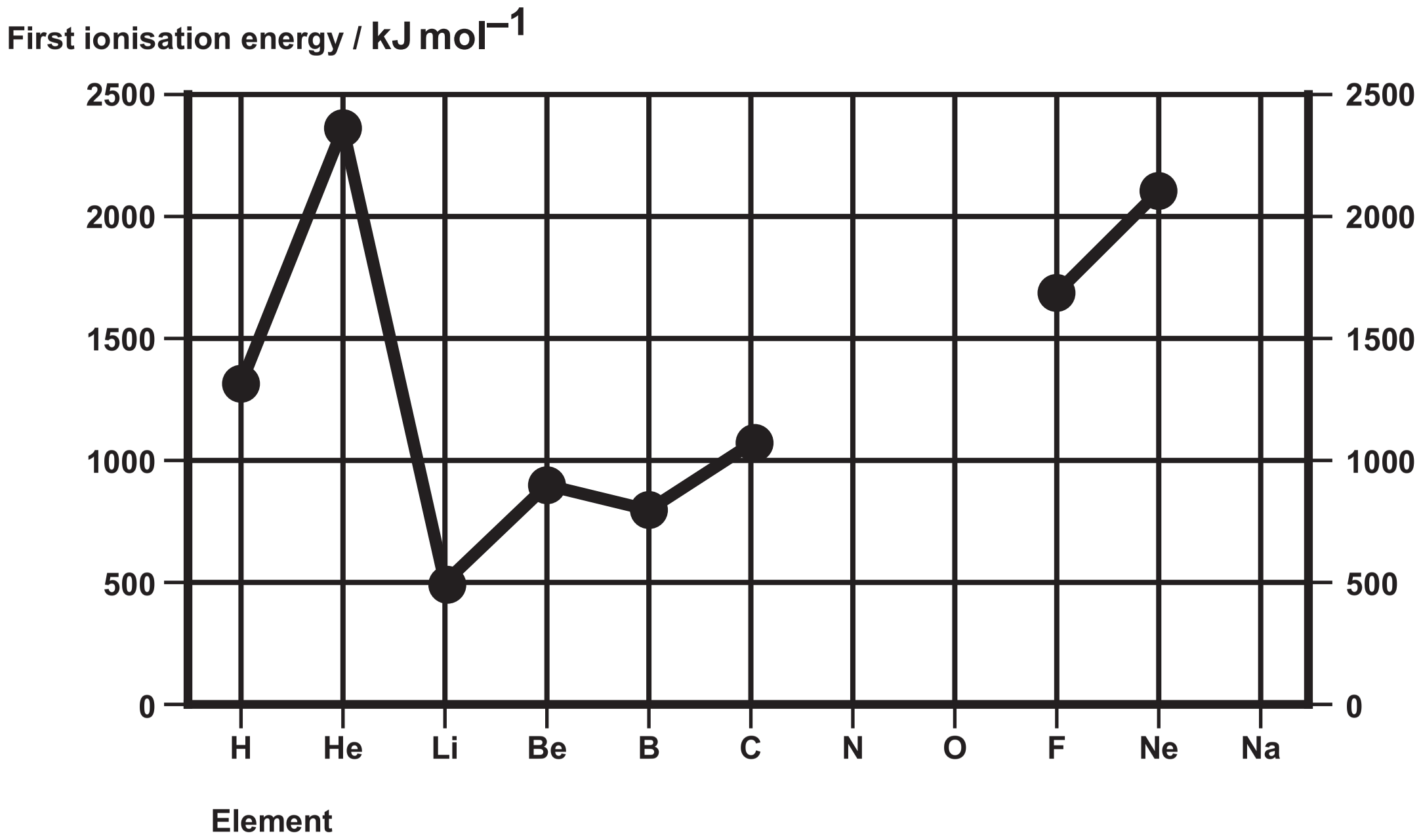
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Question 1

Isotope	Relative isotopic mass	Percentage abundance
^{36}Ar	35.97	0·337
^{38}Ar	37.96	0·063
^{40}Ar	39.96	99·600

Question 2(a)


First ionisation energy / kJ mol−1
2500
2000
1500
1000
500
0
H
He
Li
Be
B
C
N
O
F
Ne
Na
Element

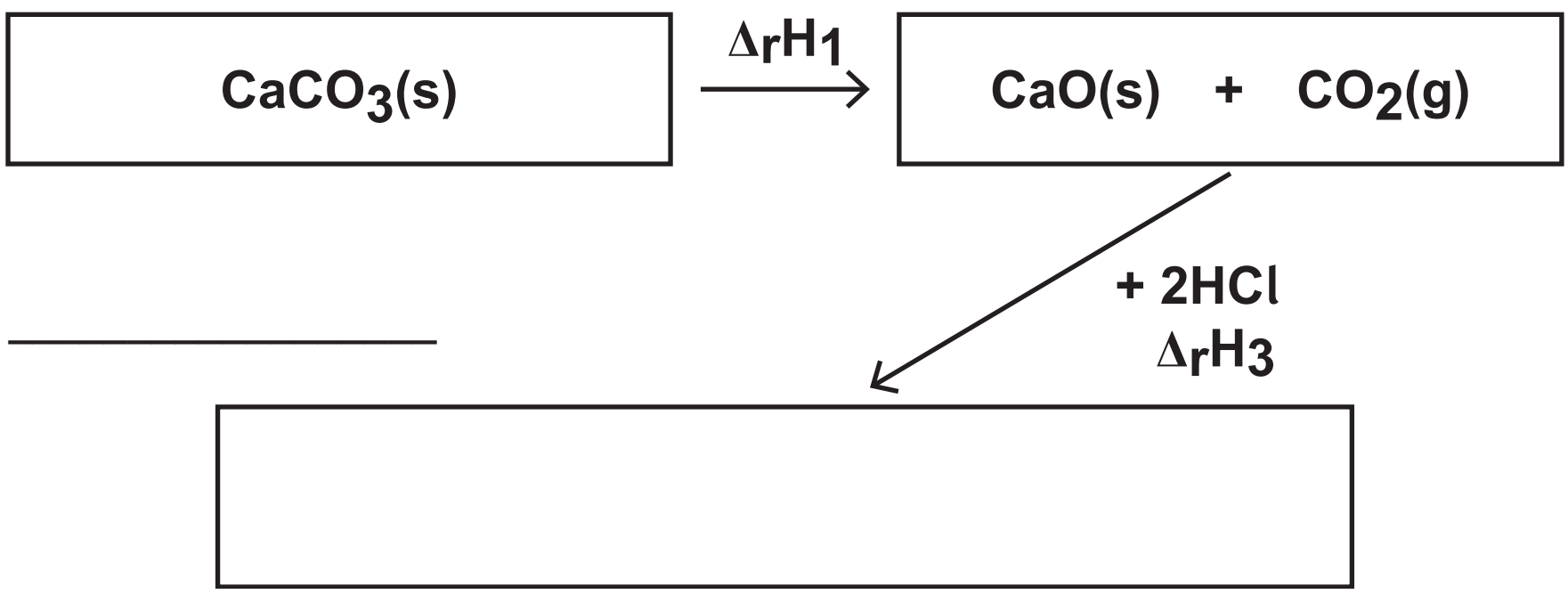
Question 2(f)

Compound	Boiling temperature / K
water (H_2O)	373
hydrogen fluoride (HF)	293
hydrogen chloride (HCl)	188
hydrogen iodide (HI)	238

Question 3(b)(i)

Measurement	Value
Mass of weighing boat with calcium carbonate / g	4·30
Mass of weighing boat after emptying out calcium carbonate / g	0·20
Mass of calcium carbonate used / g	
Temperature at the start / °C	19·0
Highest temperature / °C	
Temperature change / °C	5·5

Question 3(b)(iv)



Question 3(c)(i)

Compound	Entropy / $J\,K^{-1}\,mol^{-1}$
calcium carbonate, $CaCO_3(s)$	92·9
calcium oxide, $CaO(s)$	39·7
carbon dioxide, $CO_2(g)$	213·6

Question 6(f)

$$CrO_4^{2-}(aq) + 4H_2O(l) + 3e^- \rightleftharpoons Cr(OH)_3(s) + 5OH^-(aq) \qquad E^{\ominus} = -0{\cdot}13\,V$$

$$H_2O_2(aq) + 2e^- \rightleftharpoons 2OH^-(aq) \qquad E^{\ominus} = +0{\cdot}88\,V$$

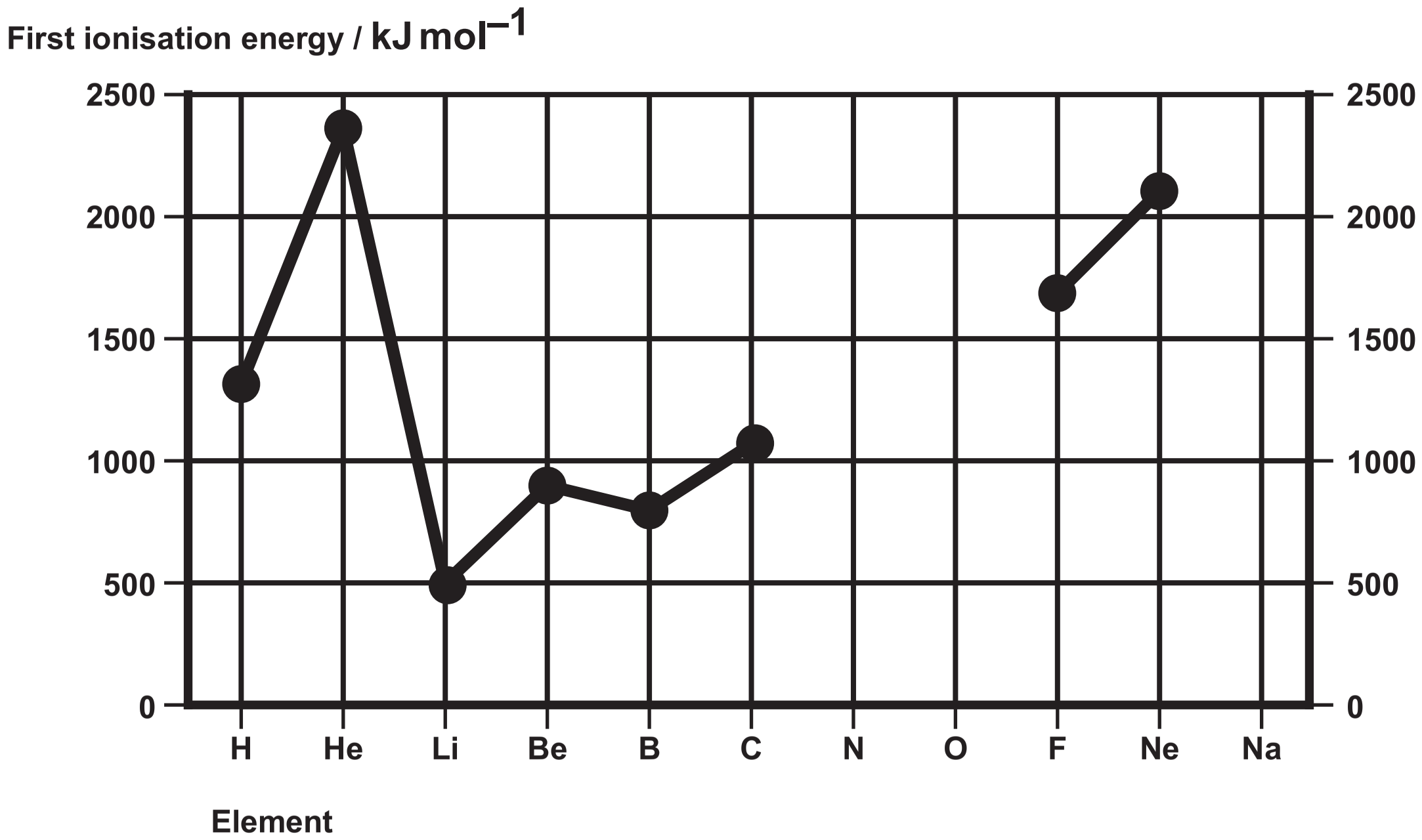
Question 8

Catalyst	Catalysed reaction
$V_2O_5(s)$	$SO_2(g) + \frac{1}{2}O_2(g) \longrightarrow SO_3(g)$
$Fe^{2+}(aq)$	$S_2O_8^{2-}(aq) + 2I^-(aq) \longrightarrow I_2(aq) + 2SO_4^{2-}(aq)$

Question 9(a)

Titration number	1	2	3	4
Final burette reading / cm^3	15·90	24·00	15·30	25·00
Initial burette reading / cm^3	0·00	8·45	0·05	
Titre / cm^3	15·90	15·55		15·65

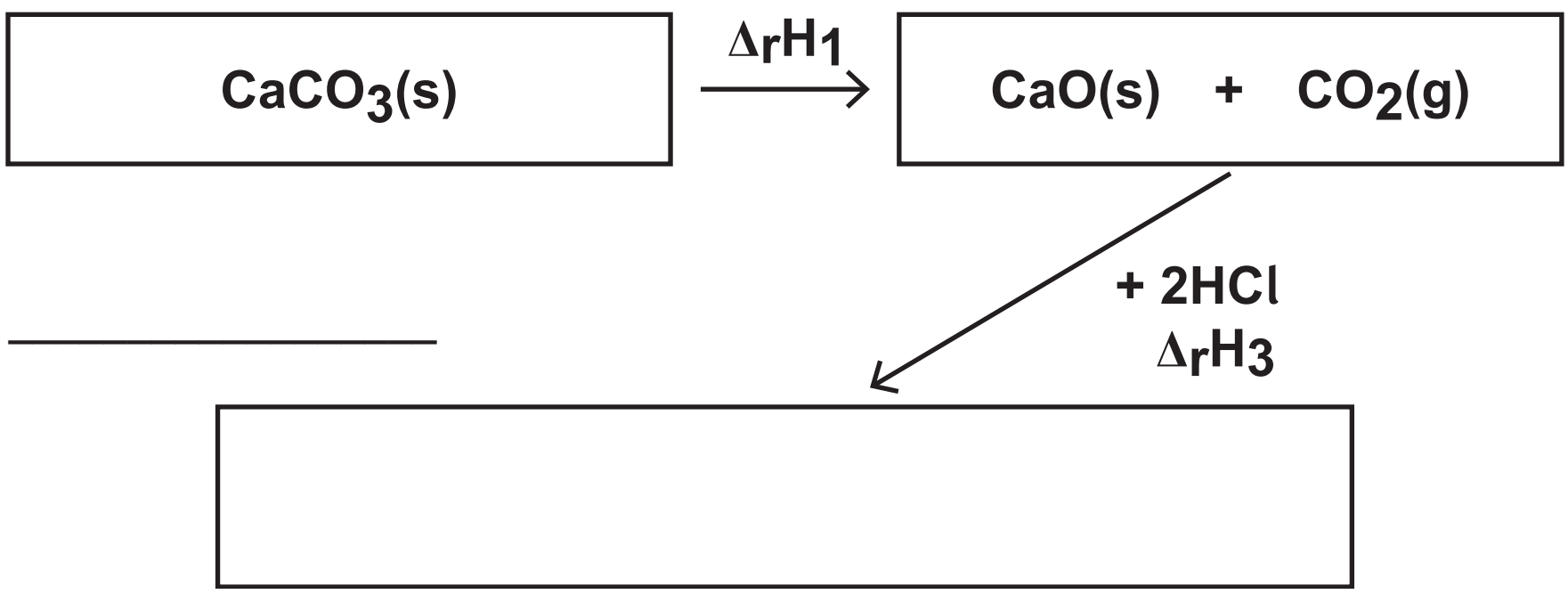
Question 2(a) – Spare copy



Question 3(b)(i) – Spare copy

Measurement	Value
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Mass of calcium carbonate used / g	
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Highest temperature / °C	
Temperature change / °C	5·5

Question 3(b)(iv) – Spare copy



Question 9(a) – Spare copy

Titration number	1	2	3	4
Final burette reading / cm^3	15·90	24·00	15·30	25·00
Initial burette reading / cm^3	0·00	8·45	0·05	
Titre / cm^3	15·90	15·55		15·65