

Chemistry
PAPER 2
Foundation Tier

Tuesday 13 June 2023 – Morning

Diagram Booklet

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

INSTRUCTIONS

There may be spare copies of some diagrams in case you need them.

**THIS DIAGRAM BOOKLET *MUST* BE RETURNED WITH THE
QUESTION PAPER AT THE END OF THE EXAMINATION.**

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Spare Copies

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Question 1

FIGURE 1

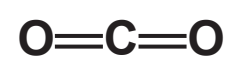
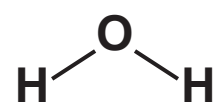
compound A	compound B	compound C	compound D
$\text{H}-\text{O}-\text{H}$	$\text{O}=\text{C}=\text{O}$	$\text{H}-\text{S}-\text{H}$	$\begin{array}{c} \text{H} \\ \\ \text{H}-\text{C}-\text{H} \\ \\ \text{H} \end{array}$

Question 1(b)

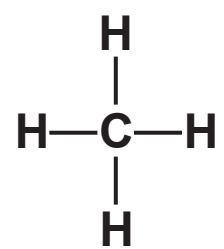
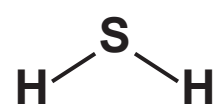
name of compound

structure of molecule

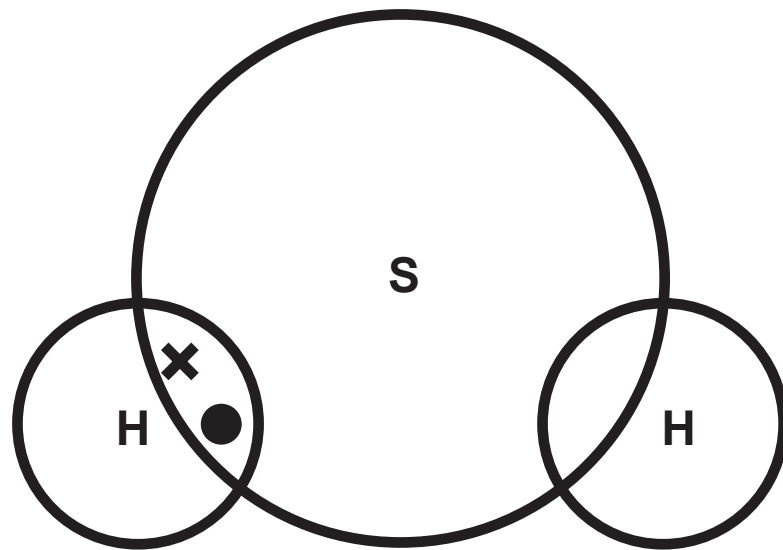
carbon dioxide



methane

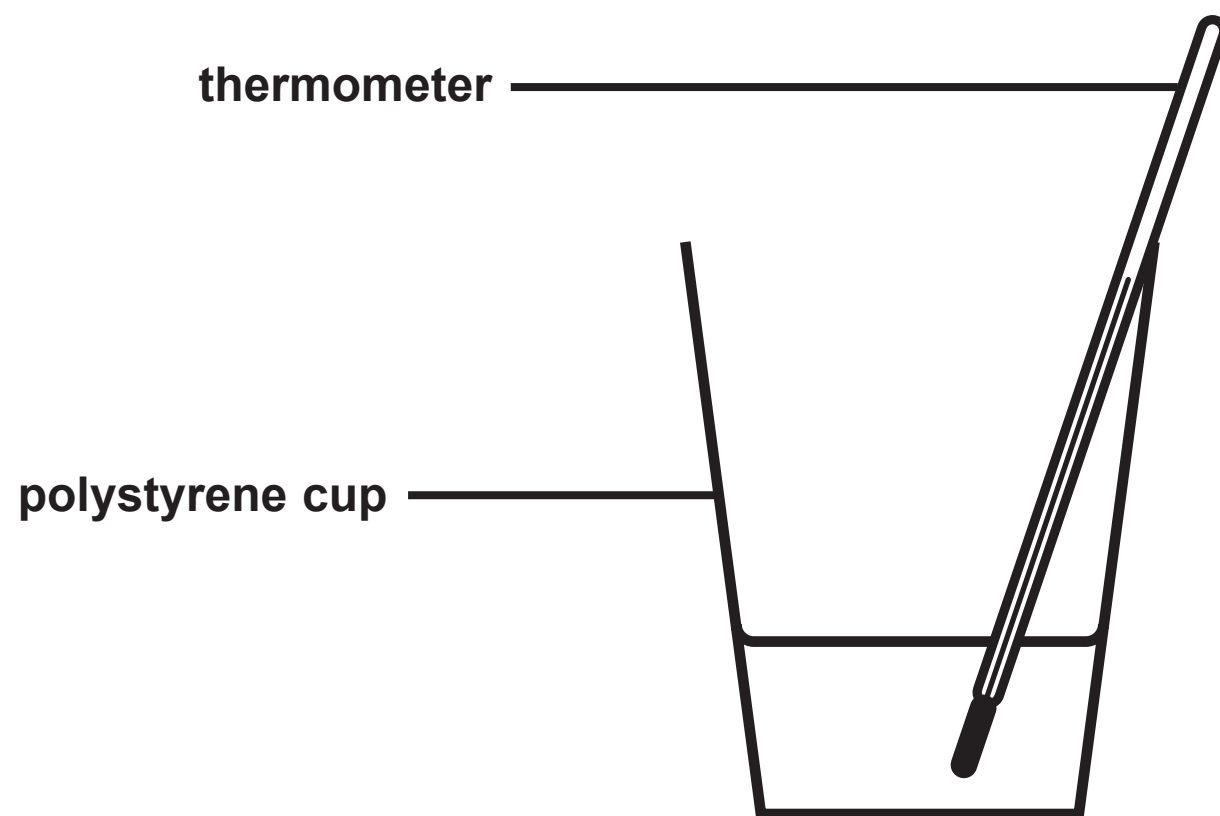


Question 1(c)



Question 2

FIGURE 3



Question 2(b)

FIGURE 5

salt	starting temperature of the water in °C	temperature of the mixture after 2 minutes in °C	temperature change in °C
A	20·5	25·6	+5·1
B	20·5	19·8	−0·7
C	20·5	29·2	

Question 3(a)(ii)

metal ion

copper ion

potassium ion

sodium ion

flame colour

blue-green

lilac

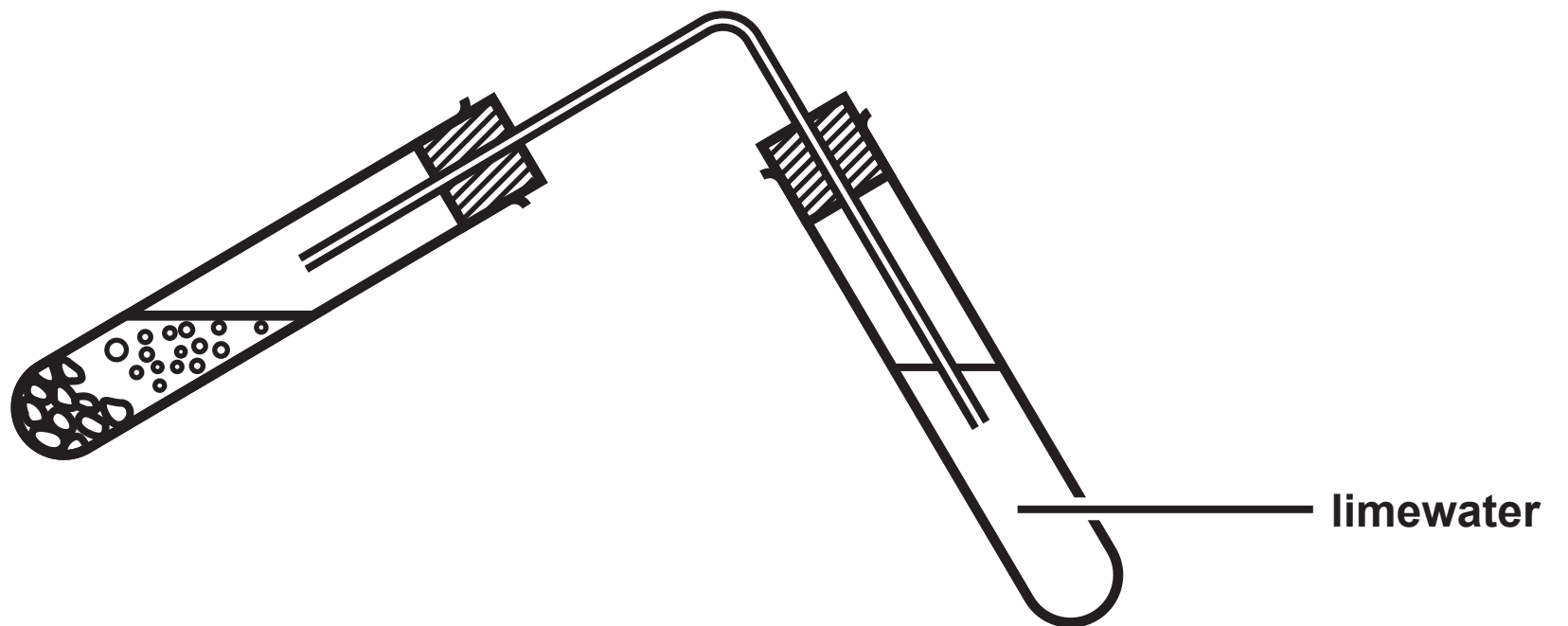
orange-red

red

yellow

Question 3(c)(ii)

FIGURE 6



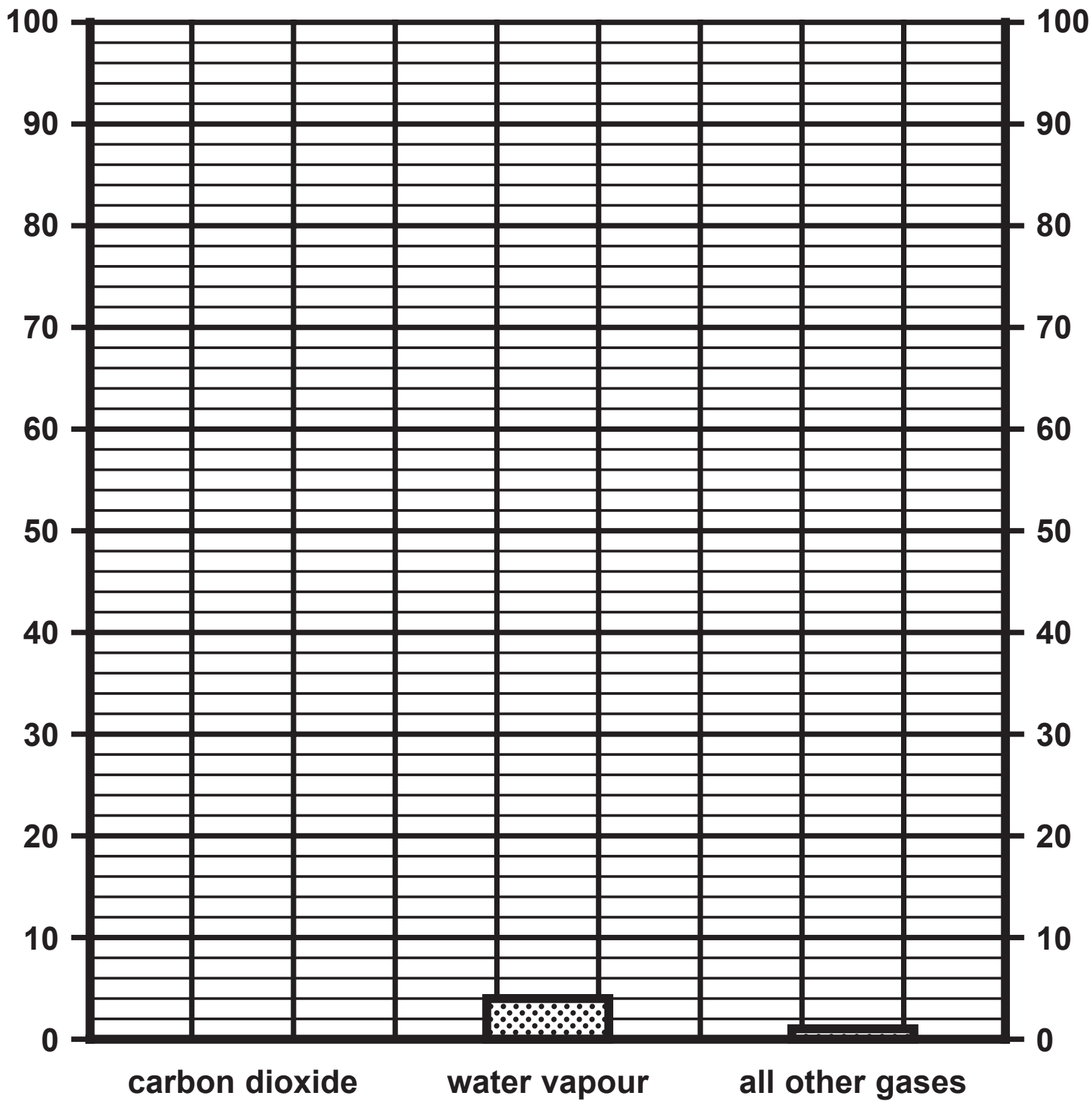
Question 4

FIGURE 7

Earth's atmosphere 3 billion years ago		Earth's atmosphere today	
gas	%	gas	%
carbon dioxide	95	nitrogen	78·00
water vapour	4	oxygen	21·00
all other gases	1	carbon dioxide	0·04
		all other gases including water vapour	0·96
average surface temperature 3 billion years ago		average surface temperature today	
above 400 °C		20 °C	

Question 4(a)

percentage of gas in Earth's
early atmosphere



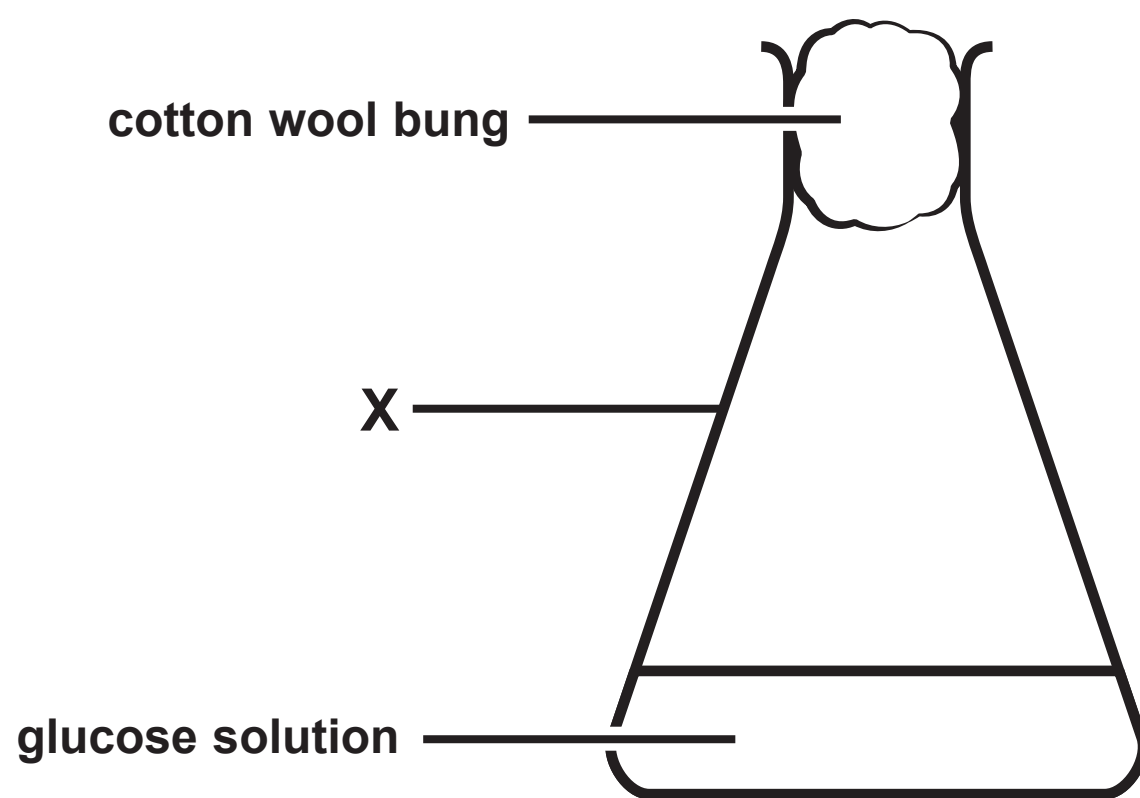
Question 4(d)

FIGURE 8

	amount of carbon dioxide in ppm
June 2001	371·17
June 2021	416·56

Question 5

FIGURE 9



Question 5(d)

Diagram A

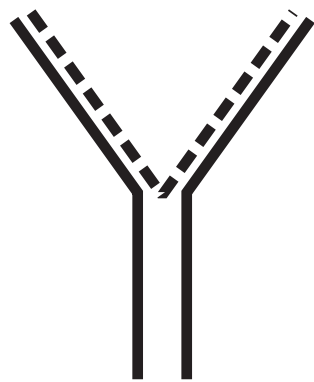


Diagram B

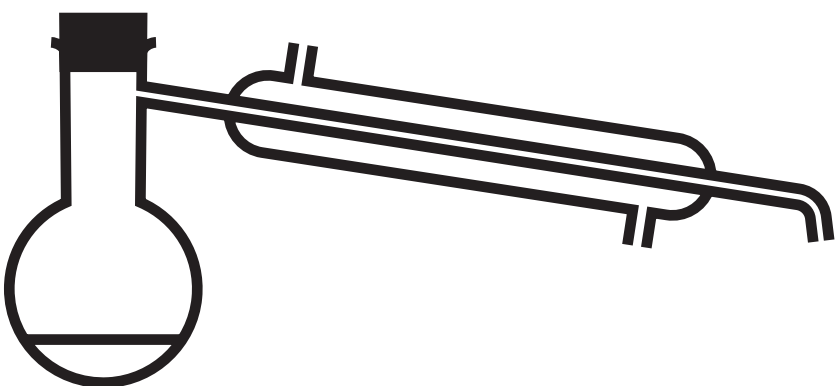


Diagram C

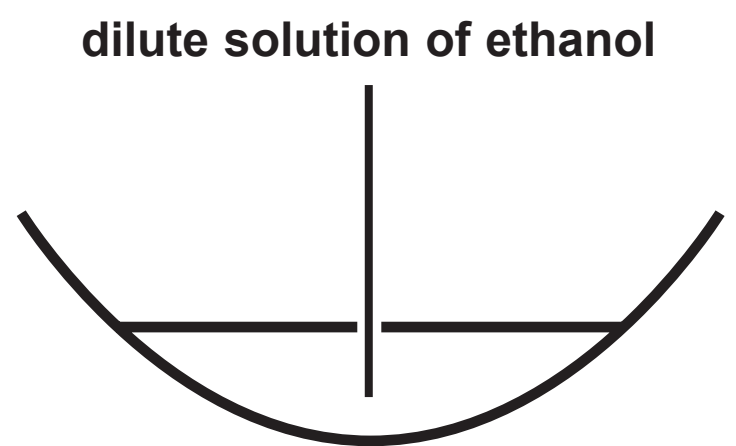
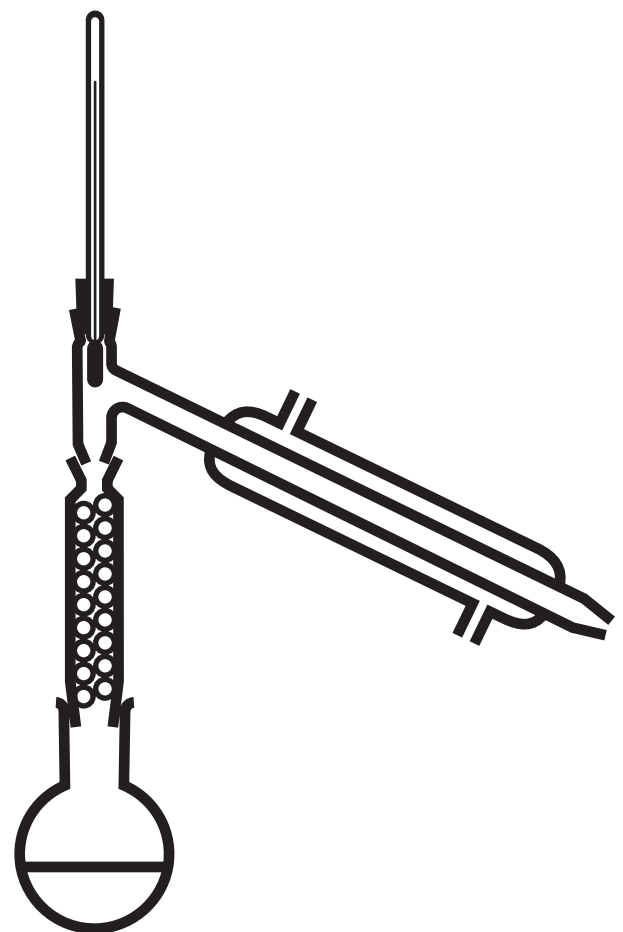
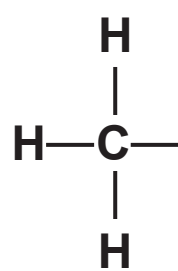


Diagram D

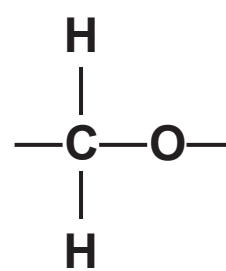


Question 5(f)

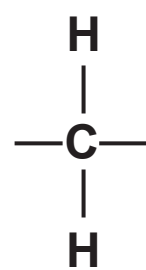
Structure A



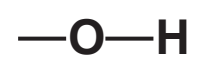
Structure C



Structure B



Structure D



Question 6(b)(v)

Diagram A

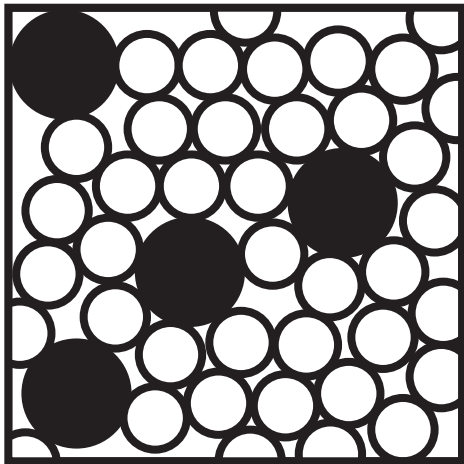


Diagram B

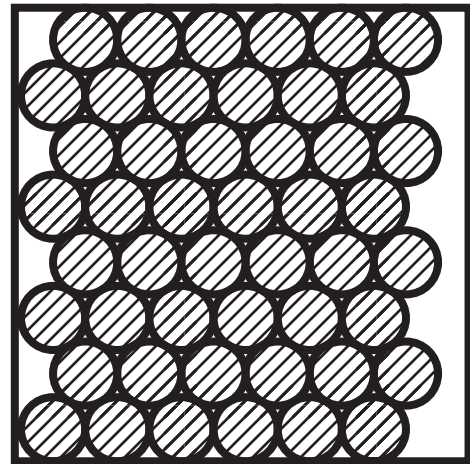


Diagram C

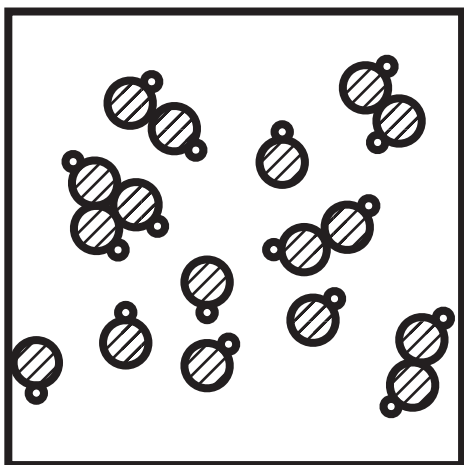
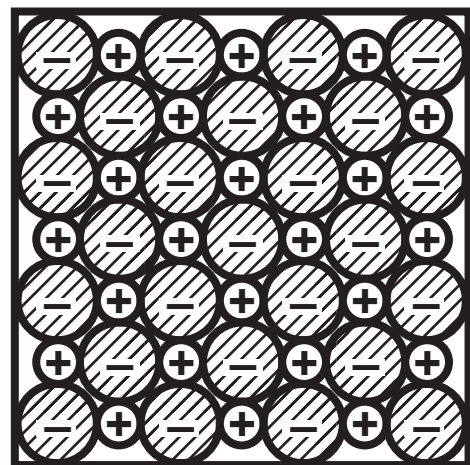
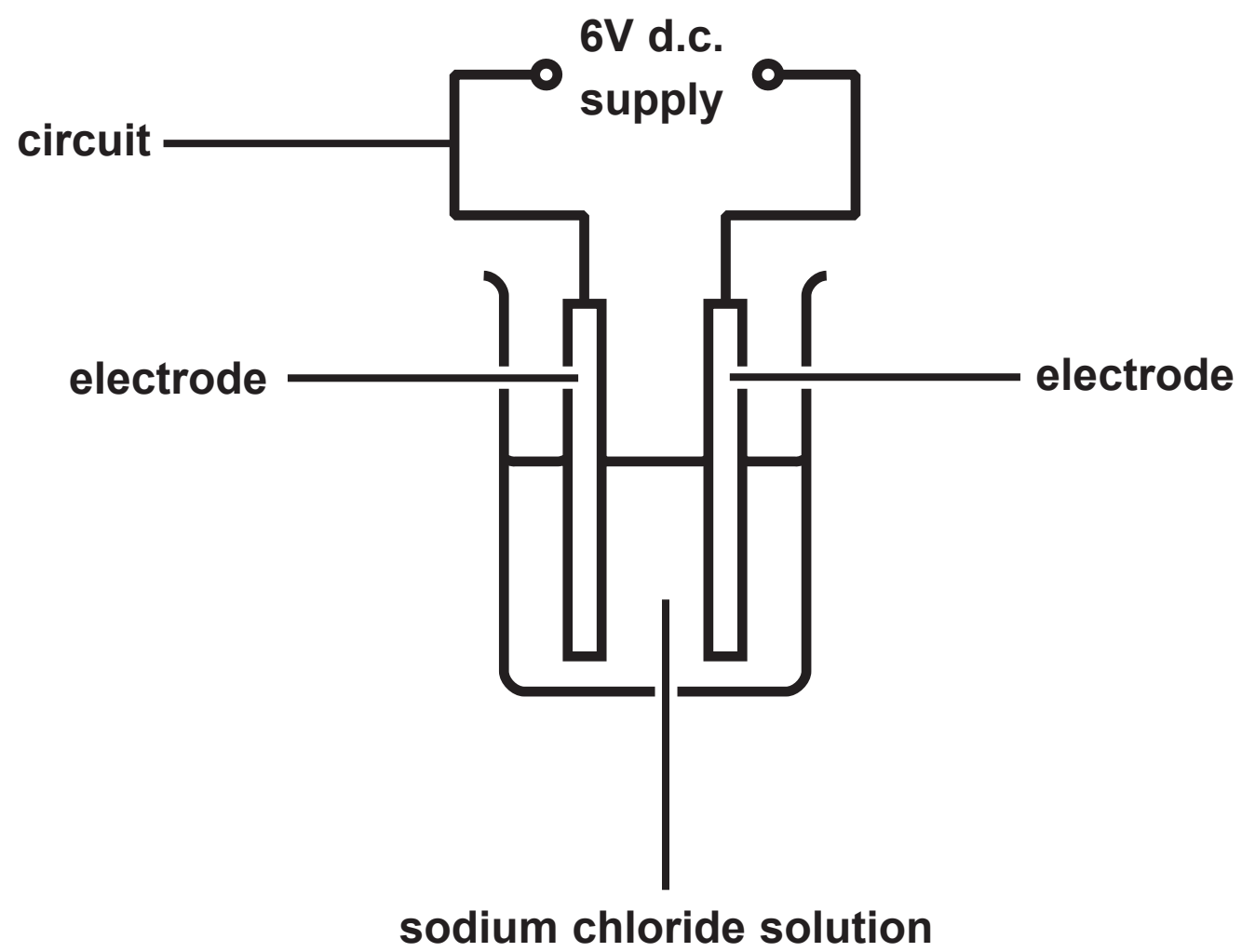


Diagram D



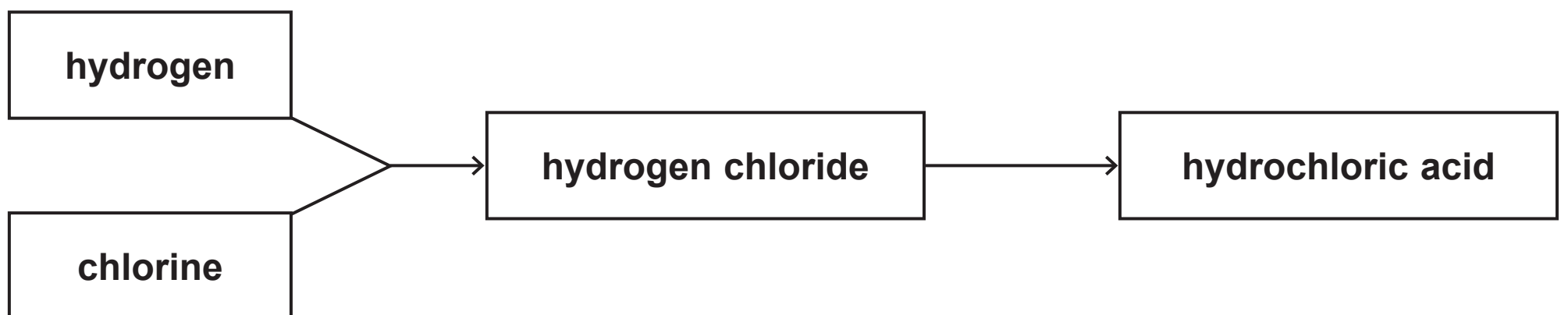
Question 6(b)(vi)

FIGURE 11



Question 6(c)

FIGURE 12

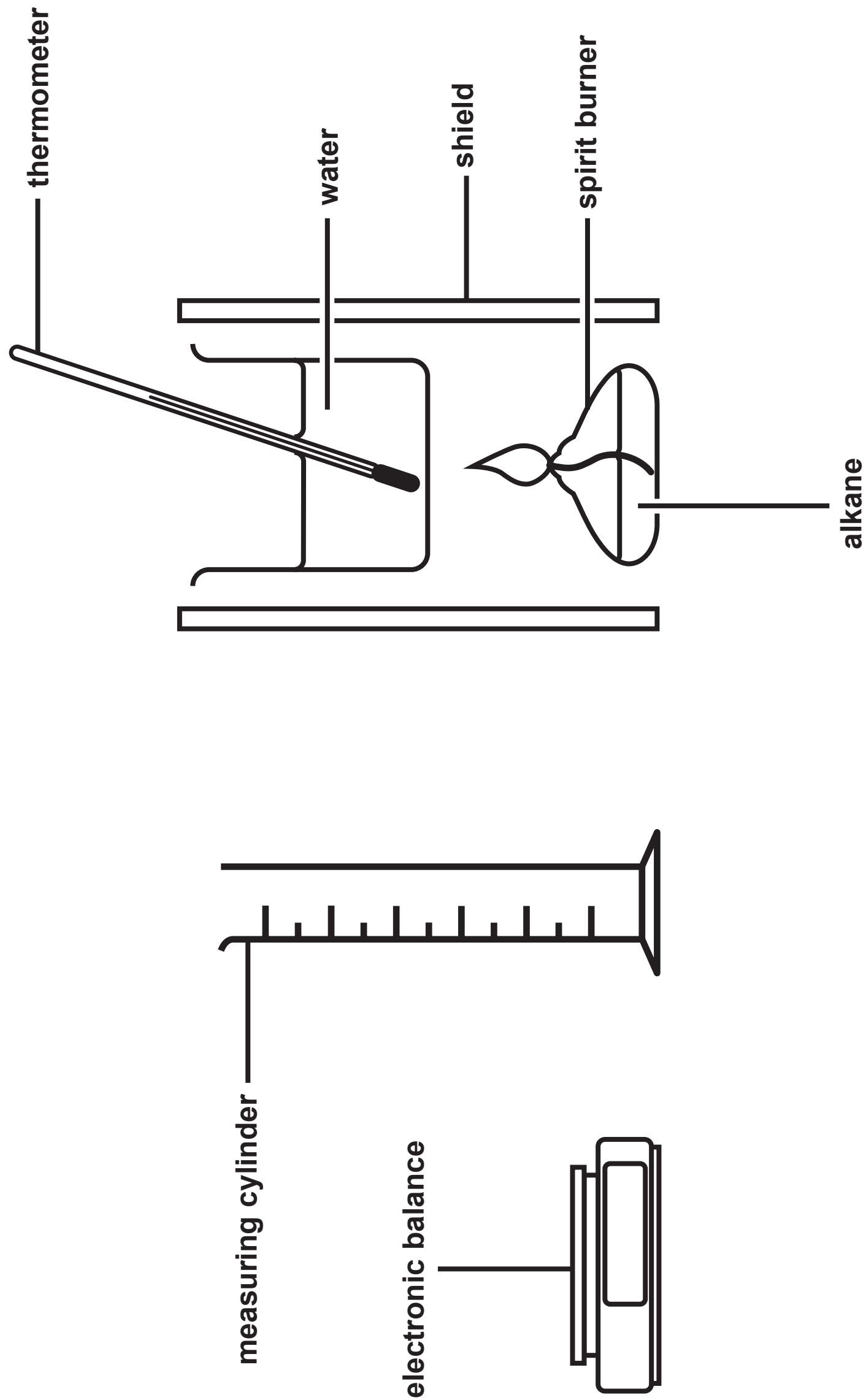


Question 7(b)(i)

FIGURE 13

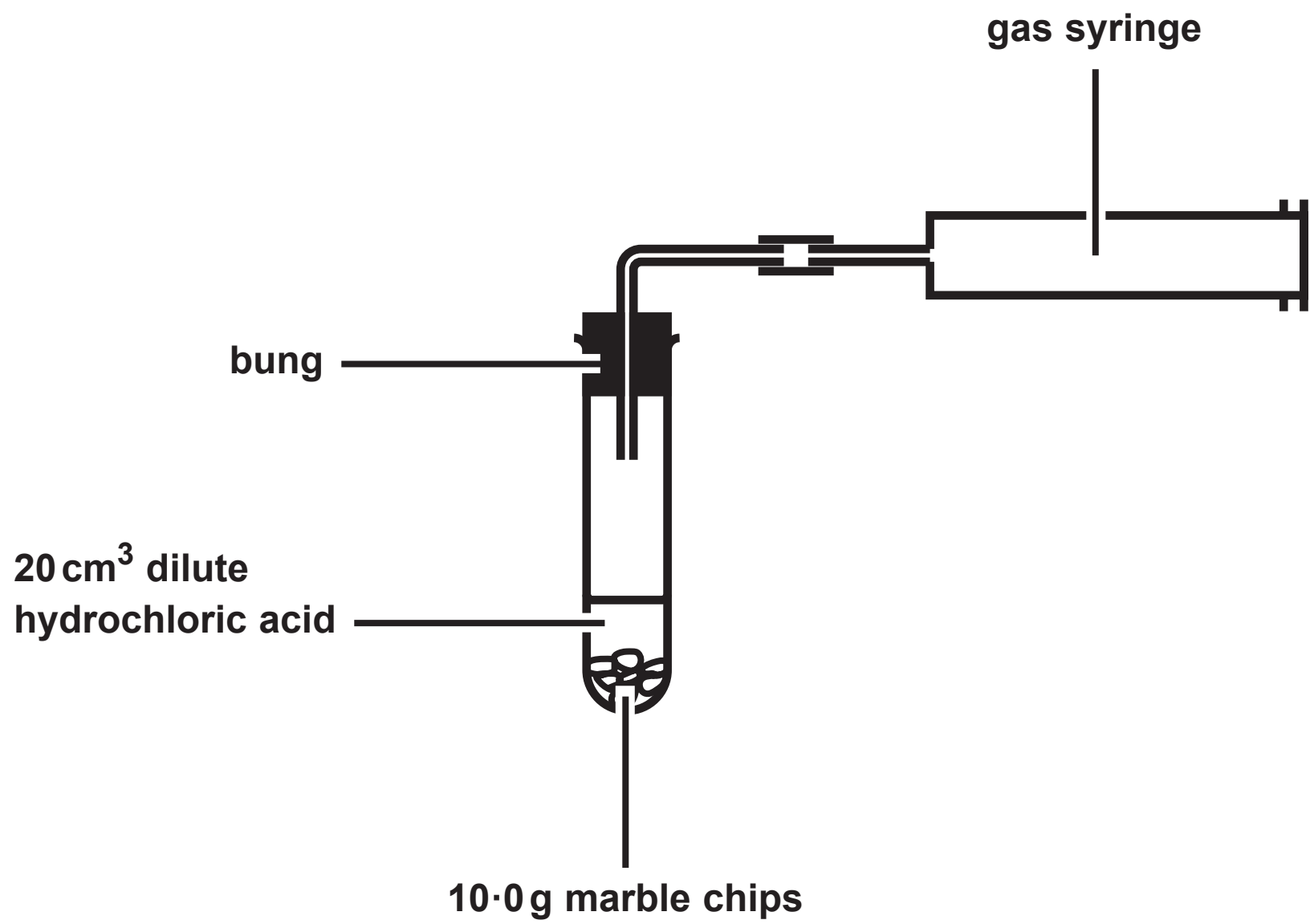
alkane	formula	structure of one molecule
propane	C_3H_8	
butane		<div><div>H</div><div>H</div><div>H</div><div>H</div><div>H—C—C—C—C—H</div><div>H</div><div>H</div><div>H</div><div>H</div></div>
pentane	C_5H_{12}	<div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H—C—C—C—C—C—H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div></div>
hexane	C_6H_{14}	<div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H—C—C—C—C—C—C—H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div></div>

FIGURE 14



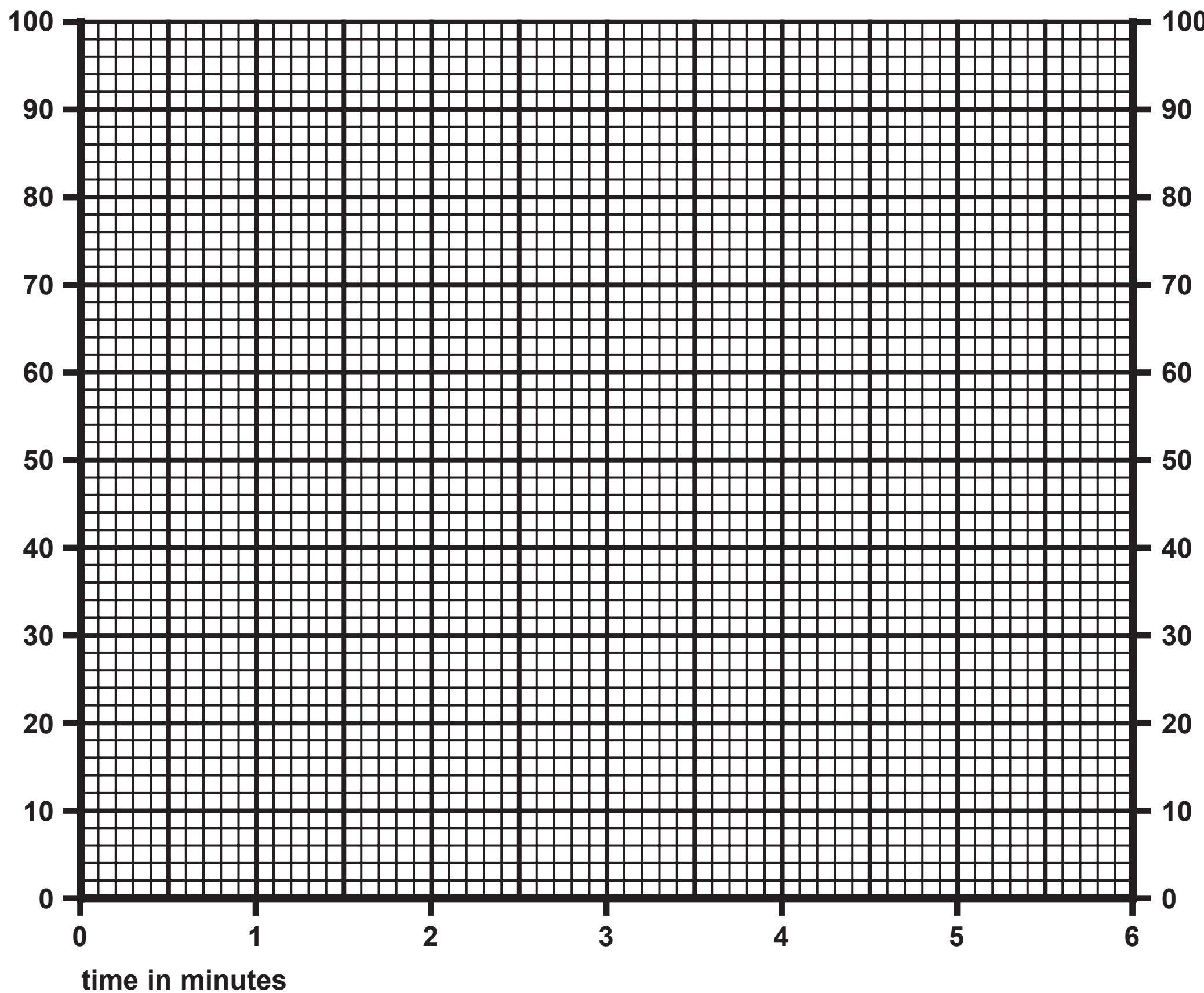
Question 8

FIGURE 15



Question 8(a) and 8(c)

volume of gas
in cm³



Question 8(b)

FIGURE 17

time interval	0 to 1 minute	1 to 2 minutes	2 to 3 minutes	3 to 4 minutes	4 to 5 minutes
rate of reaction in $\text{cm}^3 \text{min}^{-1}$	52	26		6	3

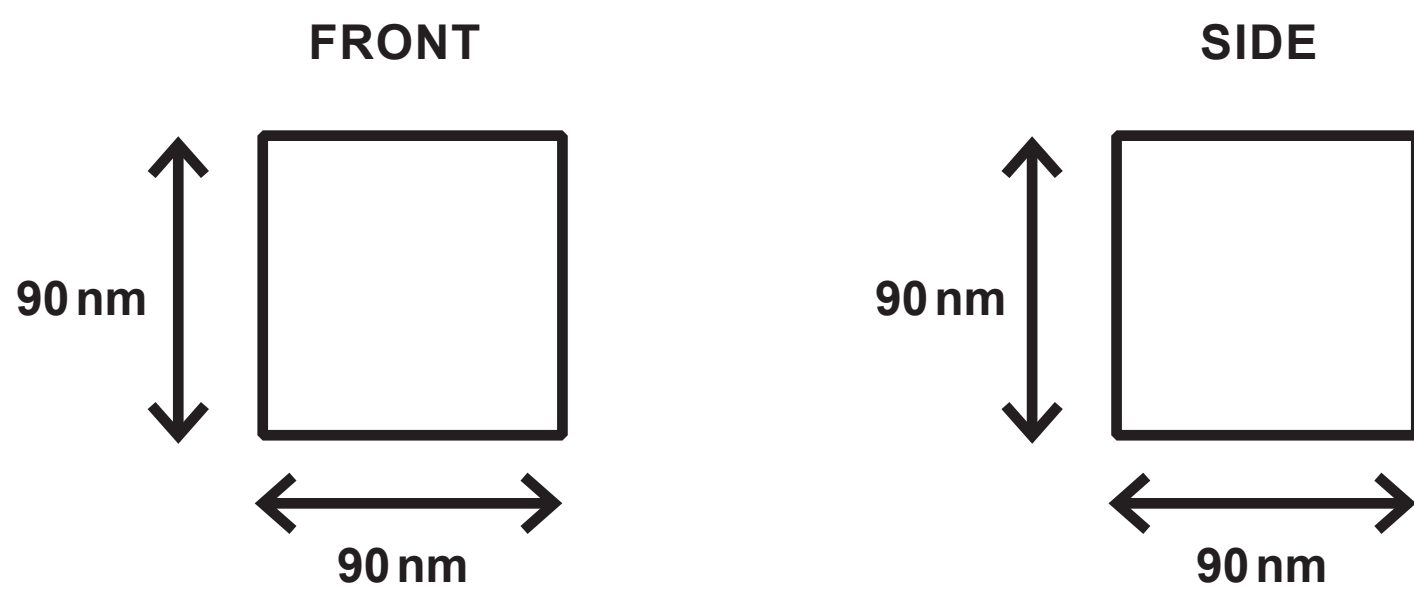
Question 9

FIGURE 18

group 1 metal	atomic number	relative atomic mass
lithium	3	7
sodium	11	23
potassium	19	39
rubidium	37	85
caesium	55	133

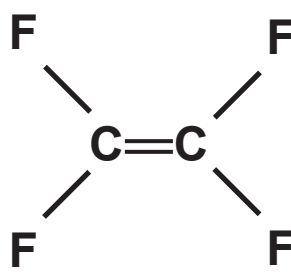
Question 10(b)

FIGURE 19



Question 10(c)

FIGURE 20

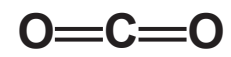
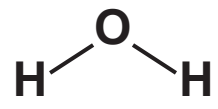


Question 1(b)

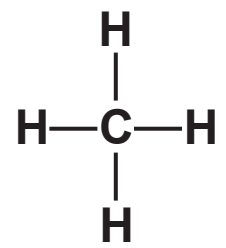
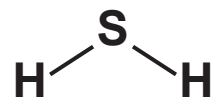
name of compound

structure of molecule

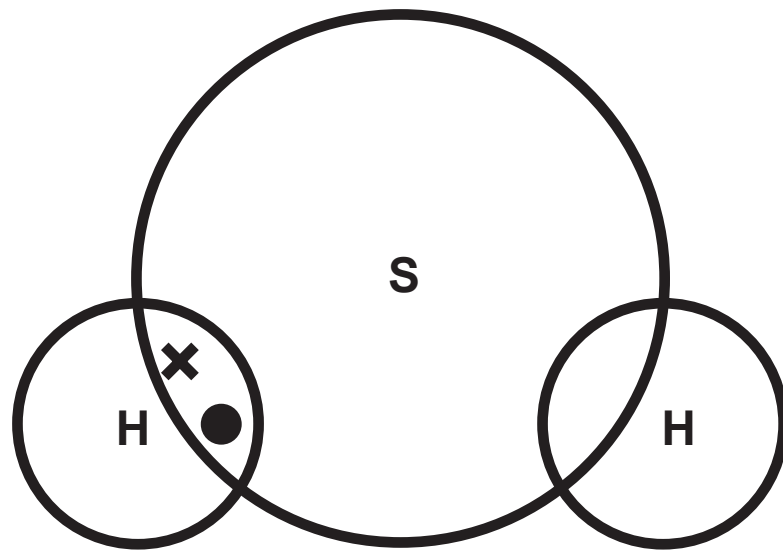
carbon dioxide



methane



Question 1(c)



Question 3(a)(ii)

metal ion

copper ion

potassium ion

sodium ion

flame colour

blue-green

lilac

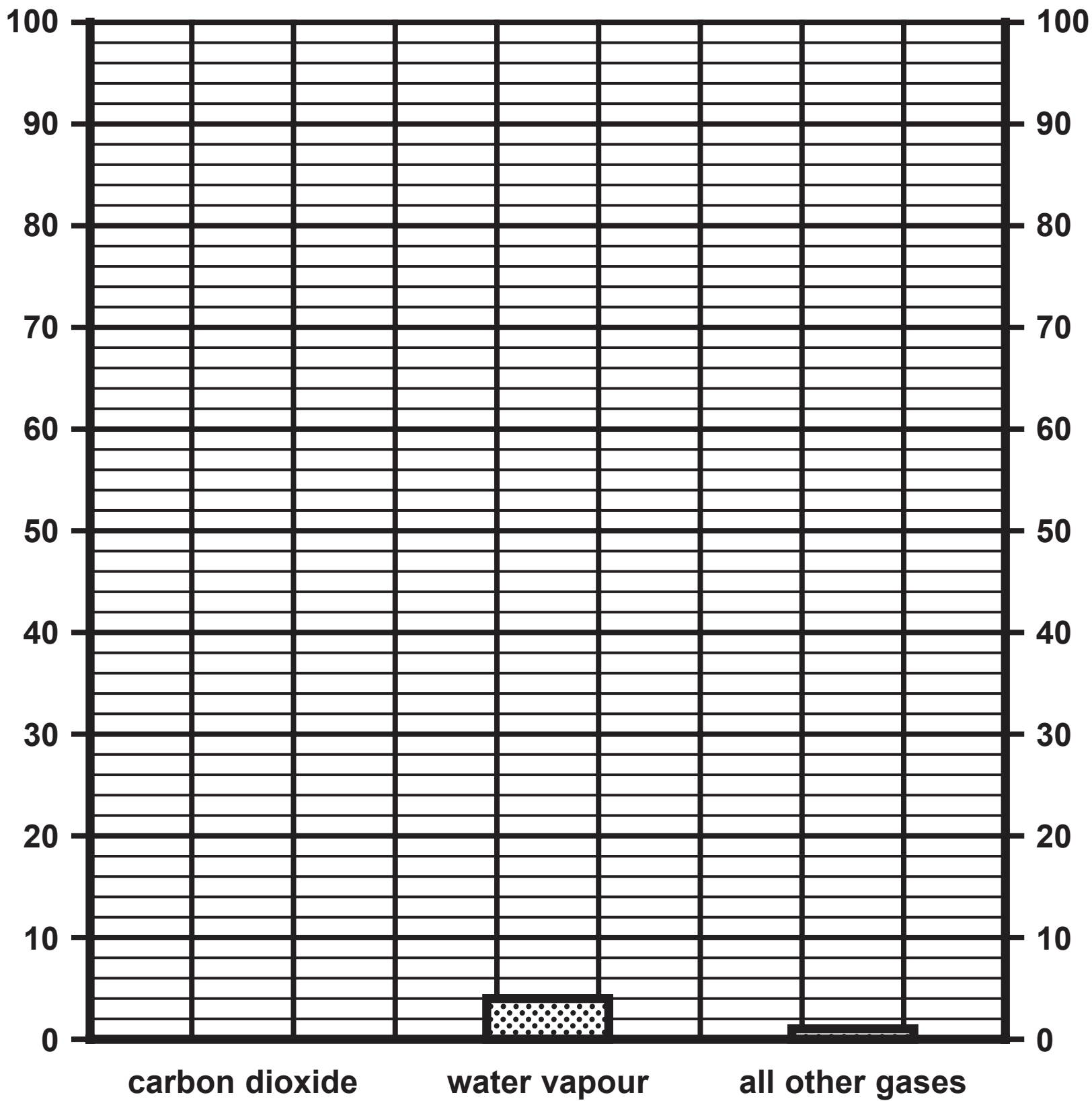
orange-red

red

yellow

Question 4(a)

percentage of gas in Earth's
early atmosphere



Question 7(b)(i)

FIGURE 13

alkane	formula	structure of one molecule
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butane		<div><div>H</div><div>H</div><div>H</div><div>H</div><div>H—C—C—C—C—H</div><div>H</div><div>H</div><div>H</div><div>H</div></div>
pentane	C ₅ H ₁₂	<div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H—C—C—C—C—C—H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div></div>
hexane	C ₆ H ₁₄	<div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H—C—C—C—C—C—C—H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div><div>H</div></div>

Question 8(a) and 8(c)

volume of gas
in cm³

