

**Chemistry**  
**UNIT: 4CH1**  
**Science (Double Award) 4SD0**  
**PAPER: 1CR**

**Friday 17 May 2024 – Morning**

**Time: 2 hours**

**Diagram Booklet**

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

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

<b>Surname</b>					
<b>Other names</b>					
<b>Centre Number</b>					
<b>Candidate Number</b>					

## INSTRUCTIONS

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

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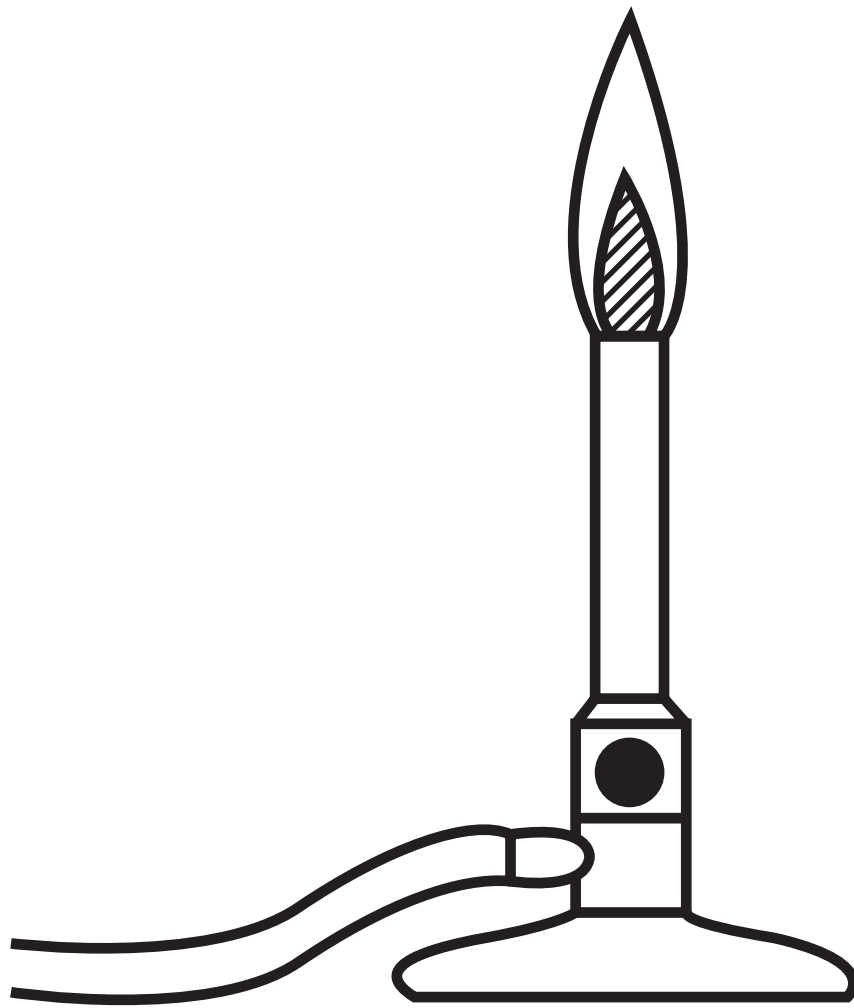
### Spare Copies

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## Question 1(a)

Species	Number of protons	Number of neutrons	Number of electrons
V	29	38	27
W	12	12	12
X	9	10	10
Y	6	6	8
Z	7	7	10

## Question 2



**Question 3(a)**

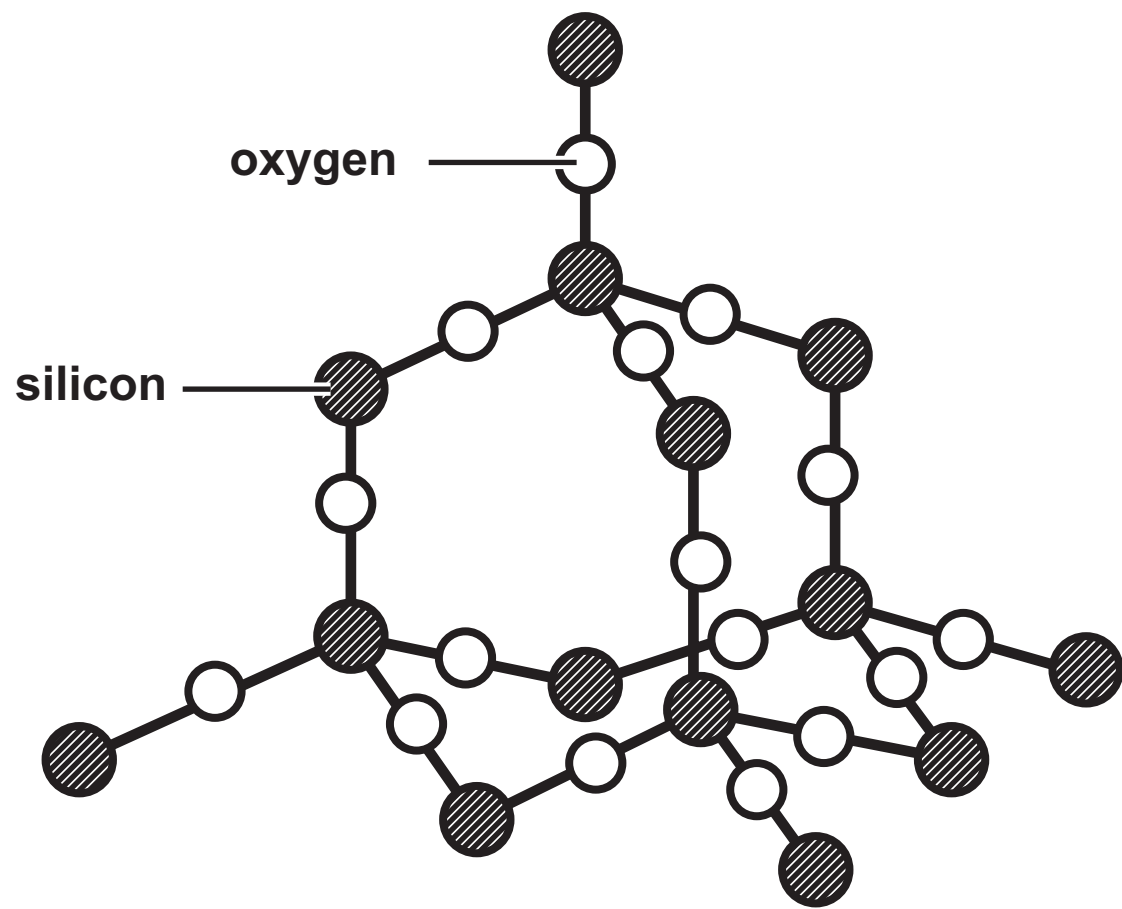
**crystallisation**

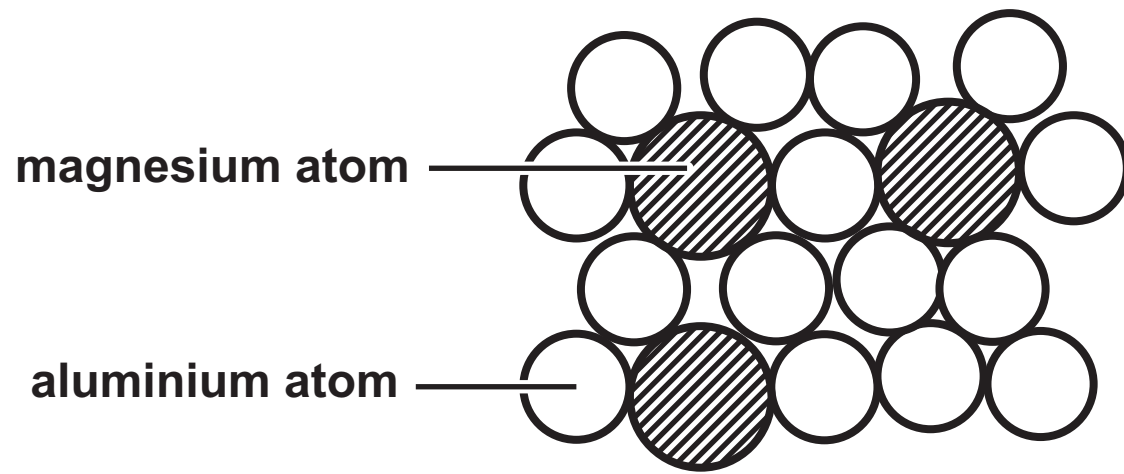
**filtration**

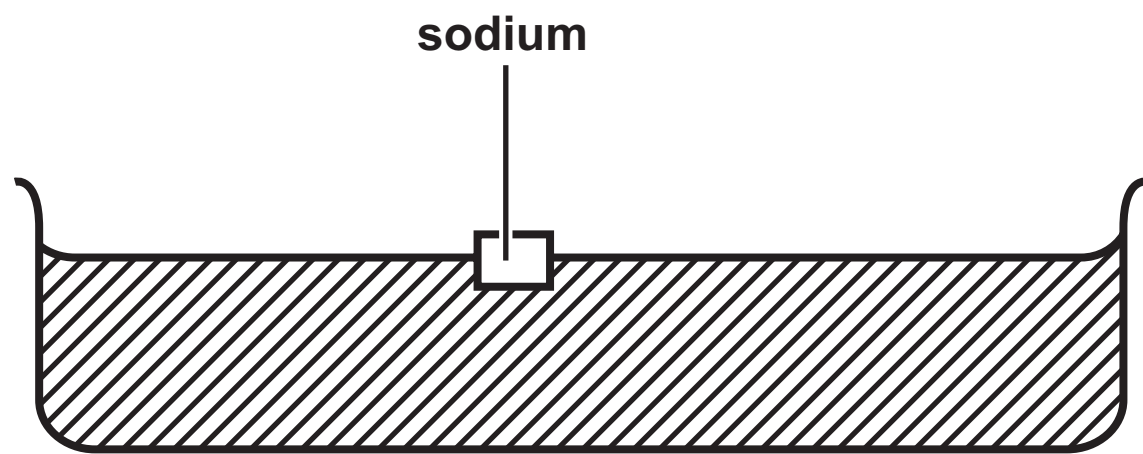
**fractional distillation**

**simple distillation**

## Question 3(b)



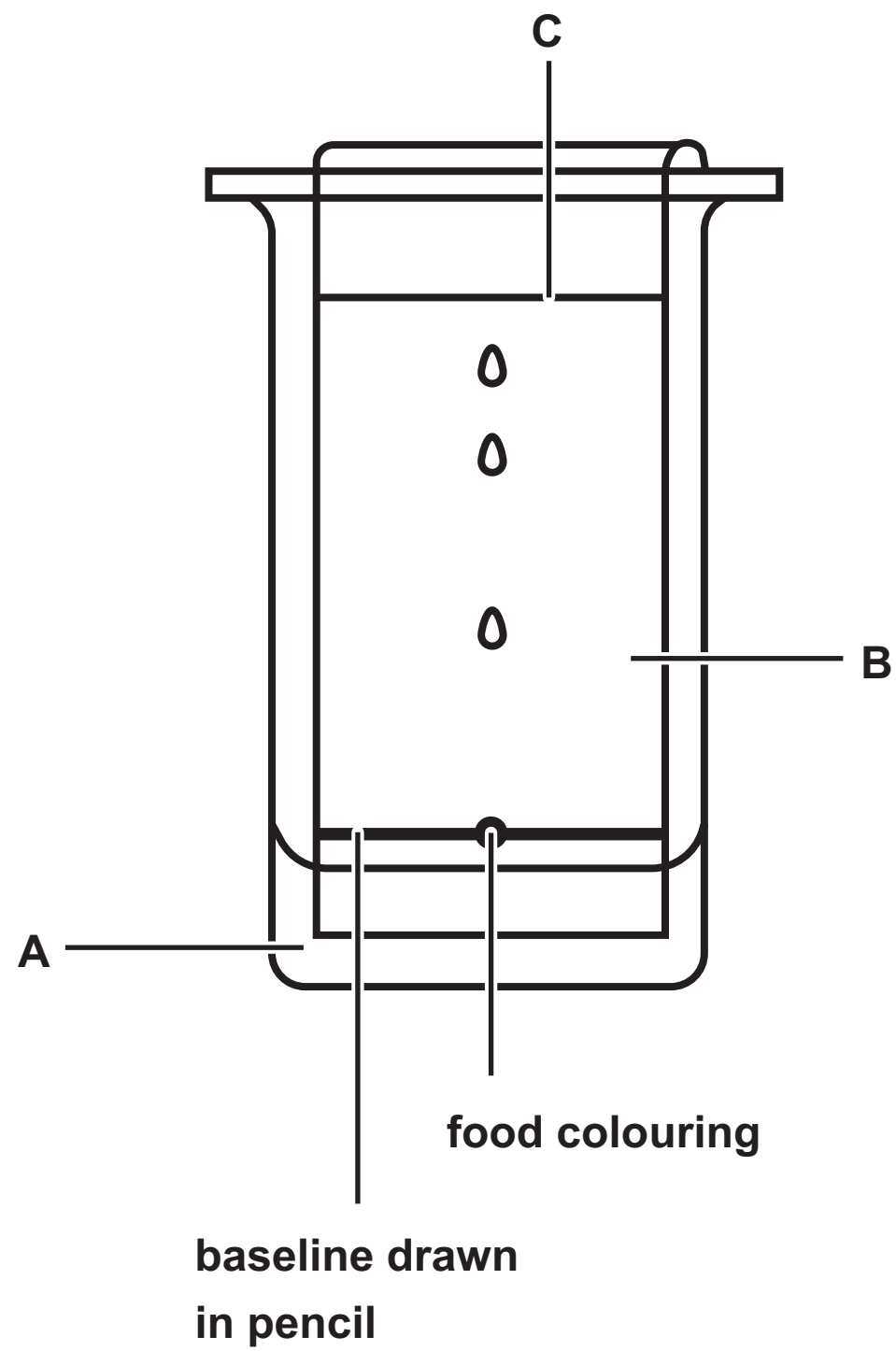
**Question 3(d)**

**Question 4**



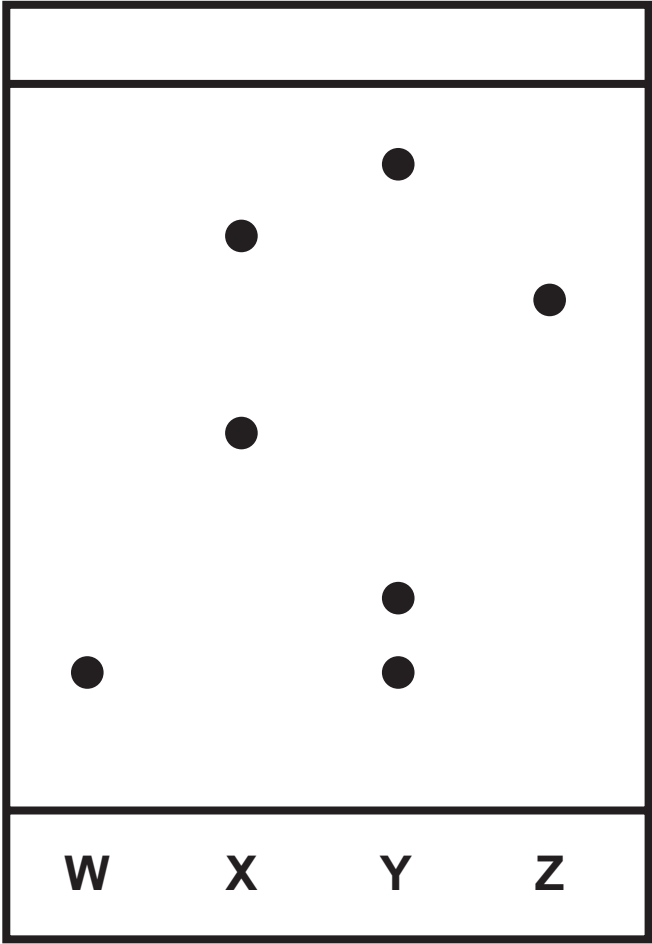
## Question 5(a)

DIAGRAM 1

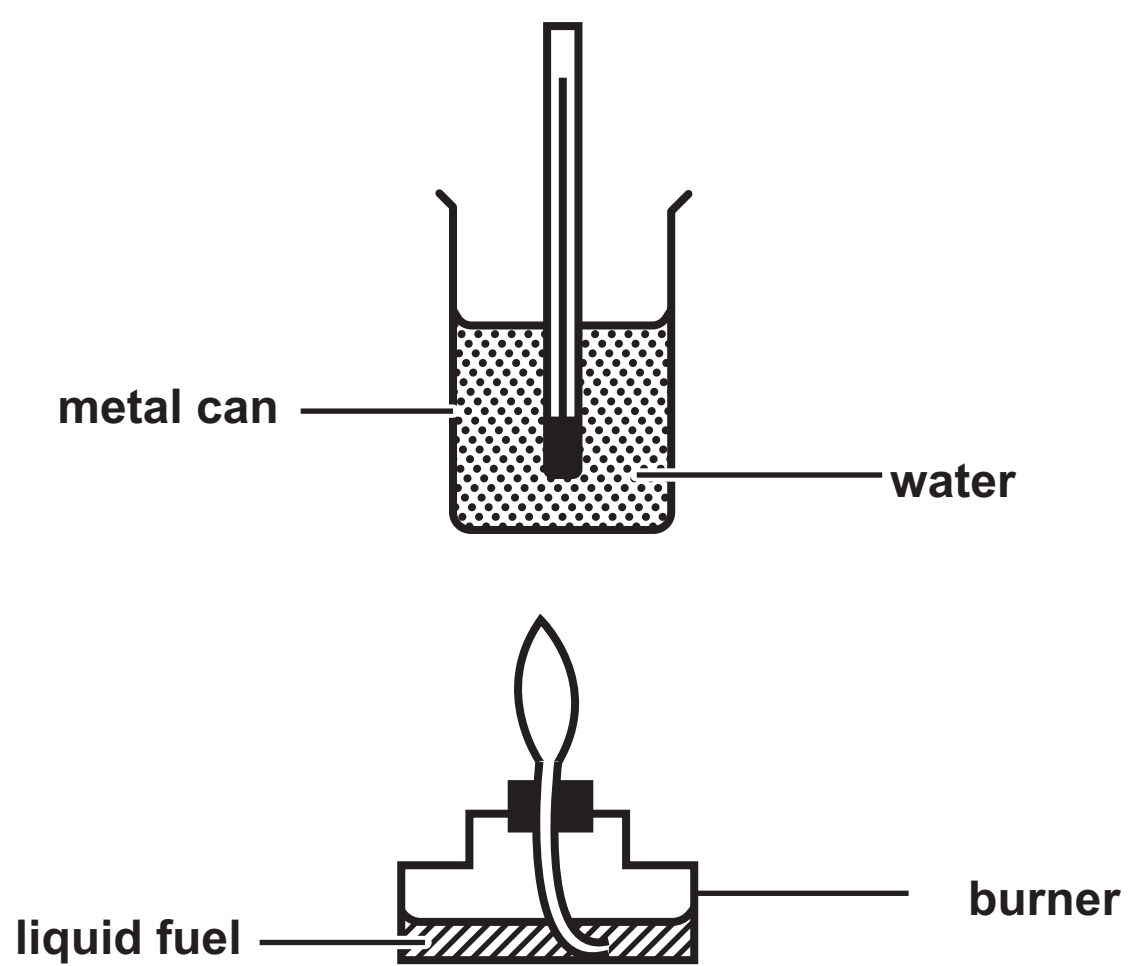


Question 5(b)

DIAGRAM 2



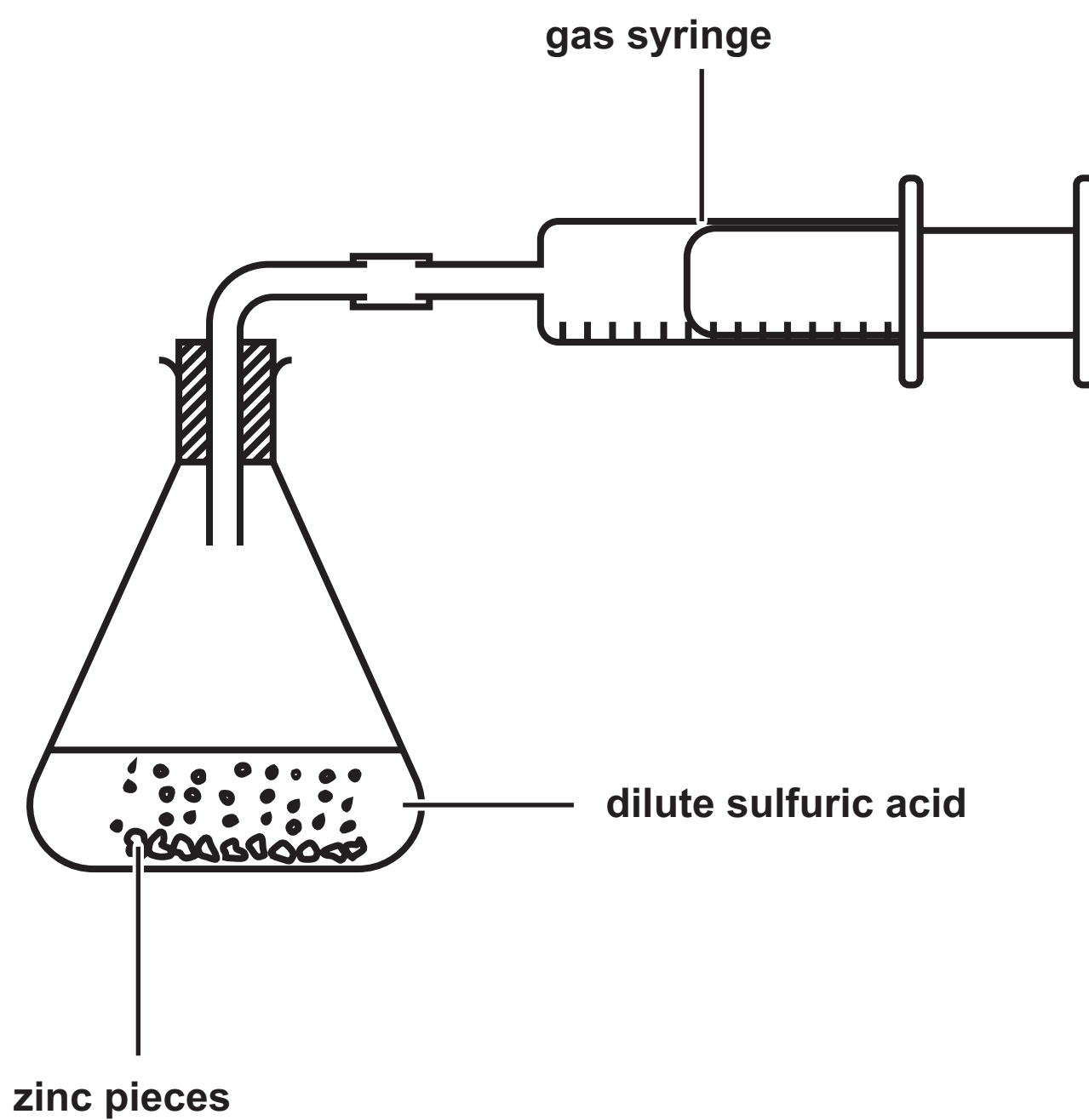
## Question 6(a)



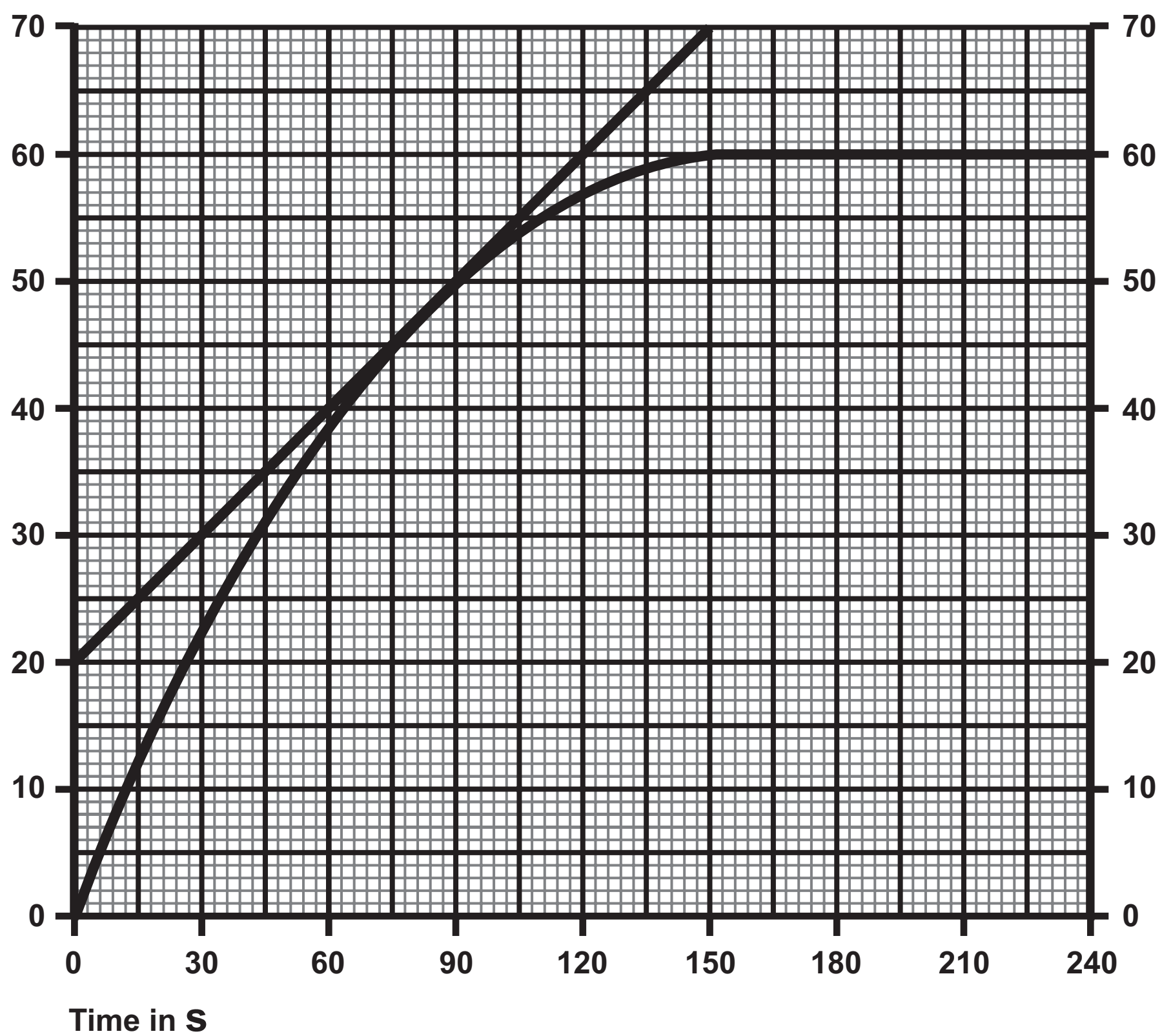
Question 6(b)(i)

temperature of the water at the start in °C	
highest temperature reached in °C	
temperature rise in °C	57.2

## Question 7

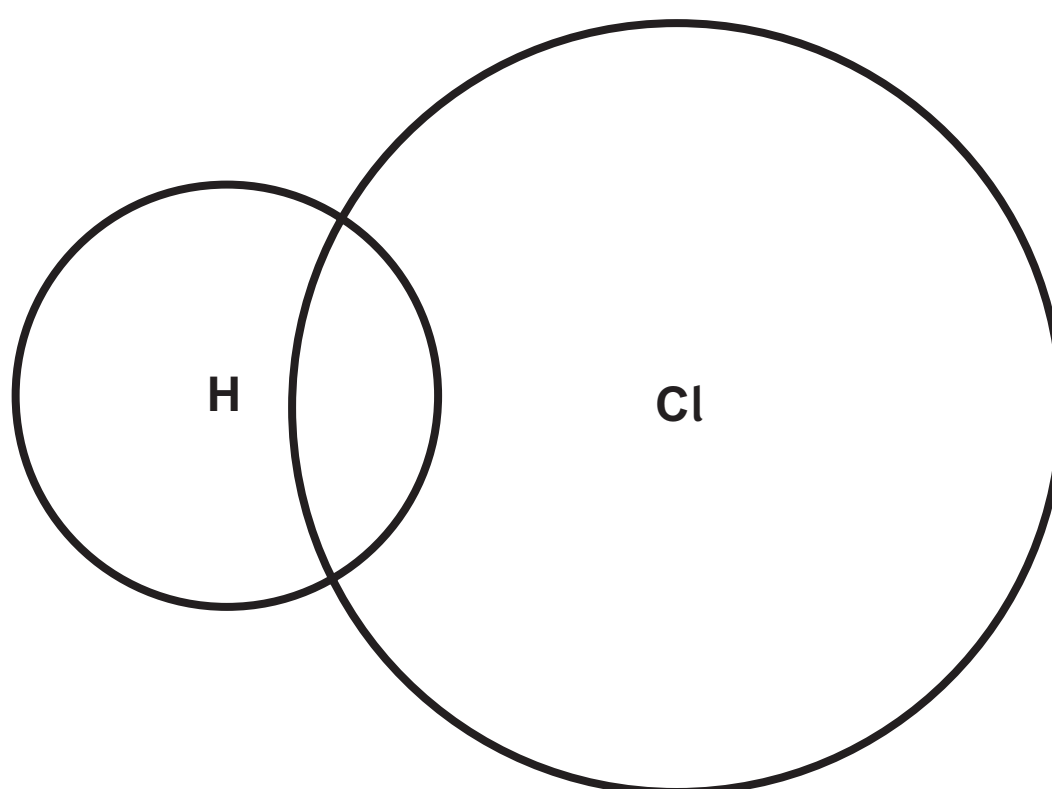


## Question 7(b)

Volume of gas in  $\text{cm}^3$ 

Question 9(a)

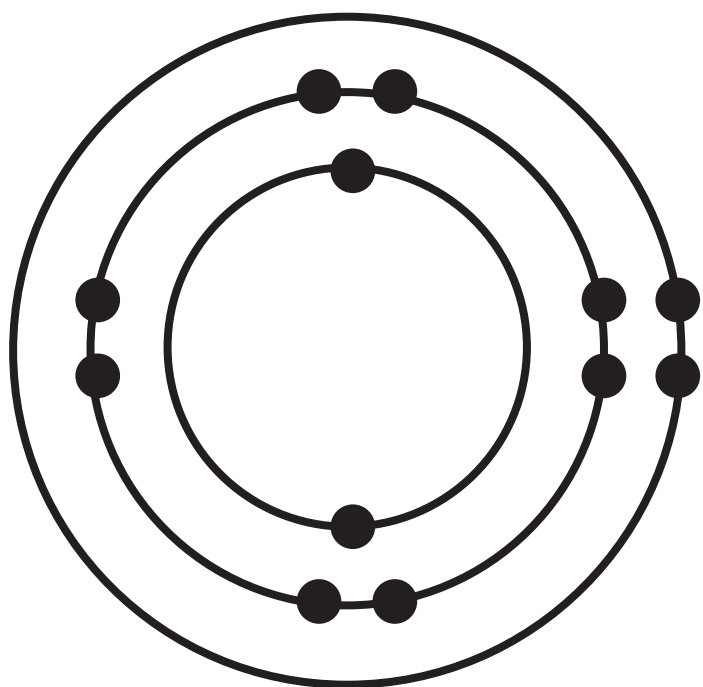
	$\text{Cl}^-$	$\text{O}^{2-}$	$\text{SO}_4^{2-}$
$\text{Na}^+$		$\text{Na}_2\text{O}$	$\text{Na}_2\text{SO}_4$
$\text{NH}_4^+$	$\text{NH}_4\text{Cl}$		
$\text{Zn}^{2+}$	$\text{ZnCl}_2$		$\text{ZnSO}_4$

**Question 9(b)(i)**



## Question 9(b)(ii)

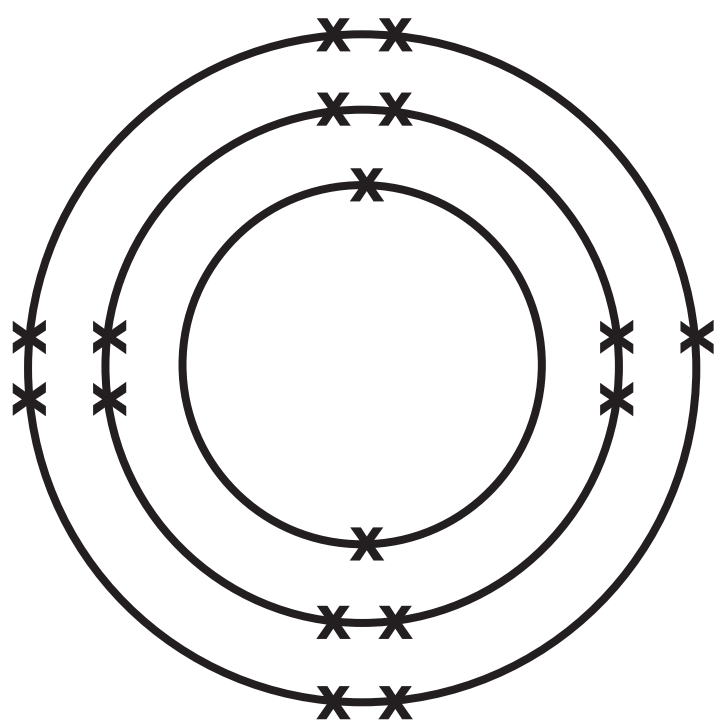
magnesium



magnesium ion

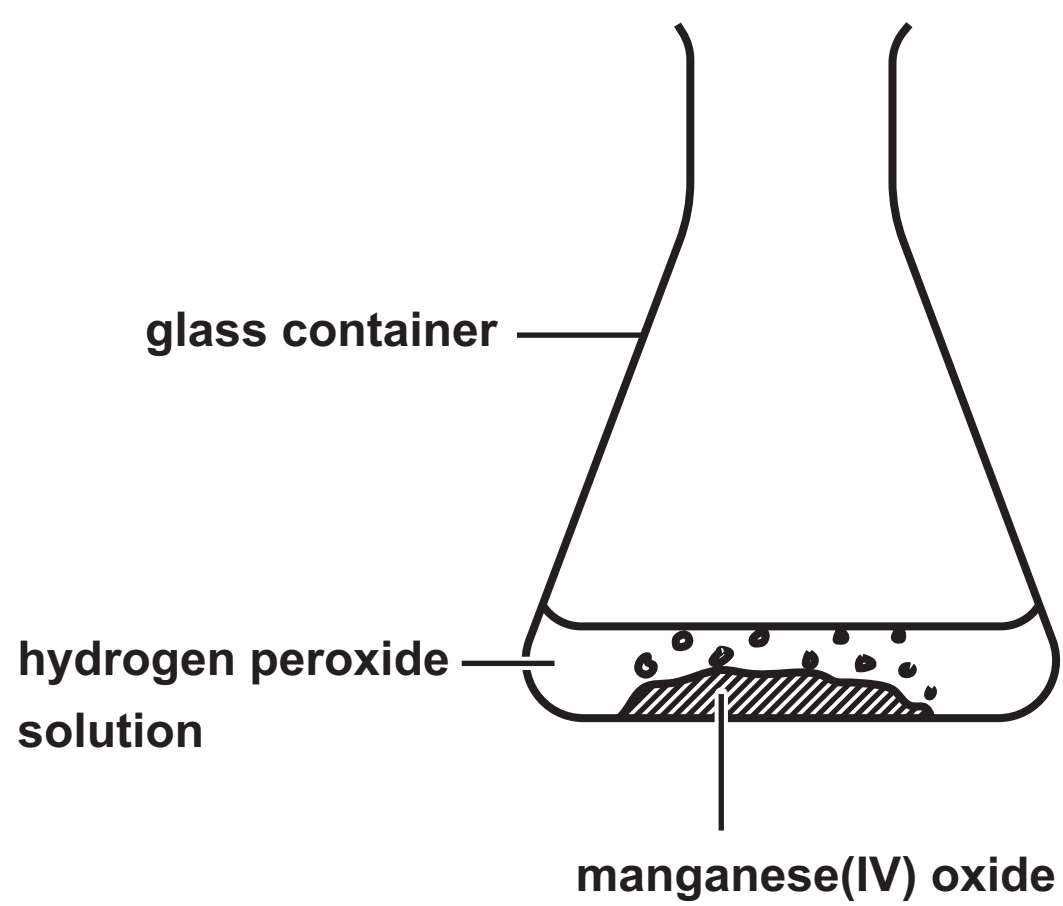
Question 9(b)(ii) – continued.

chlorine



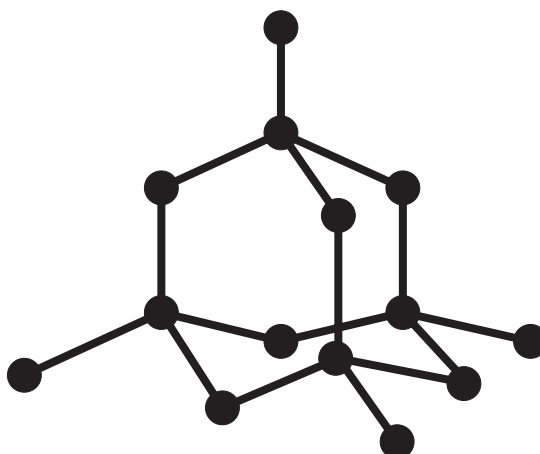
chlorine ion

## Question 10(b)

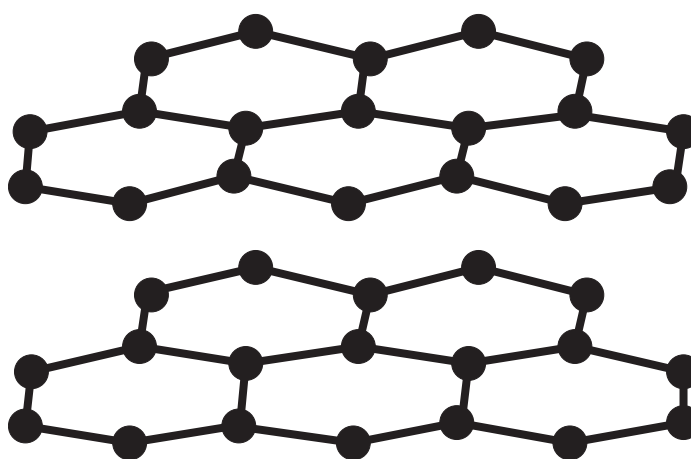


## Question 11

diamond



graphite





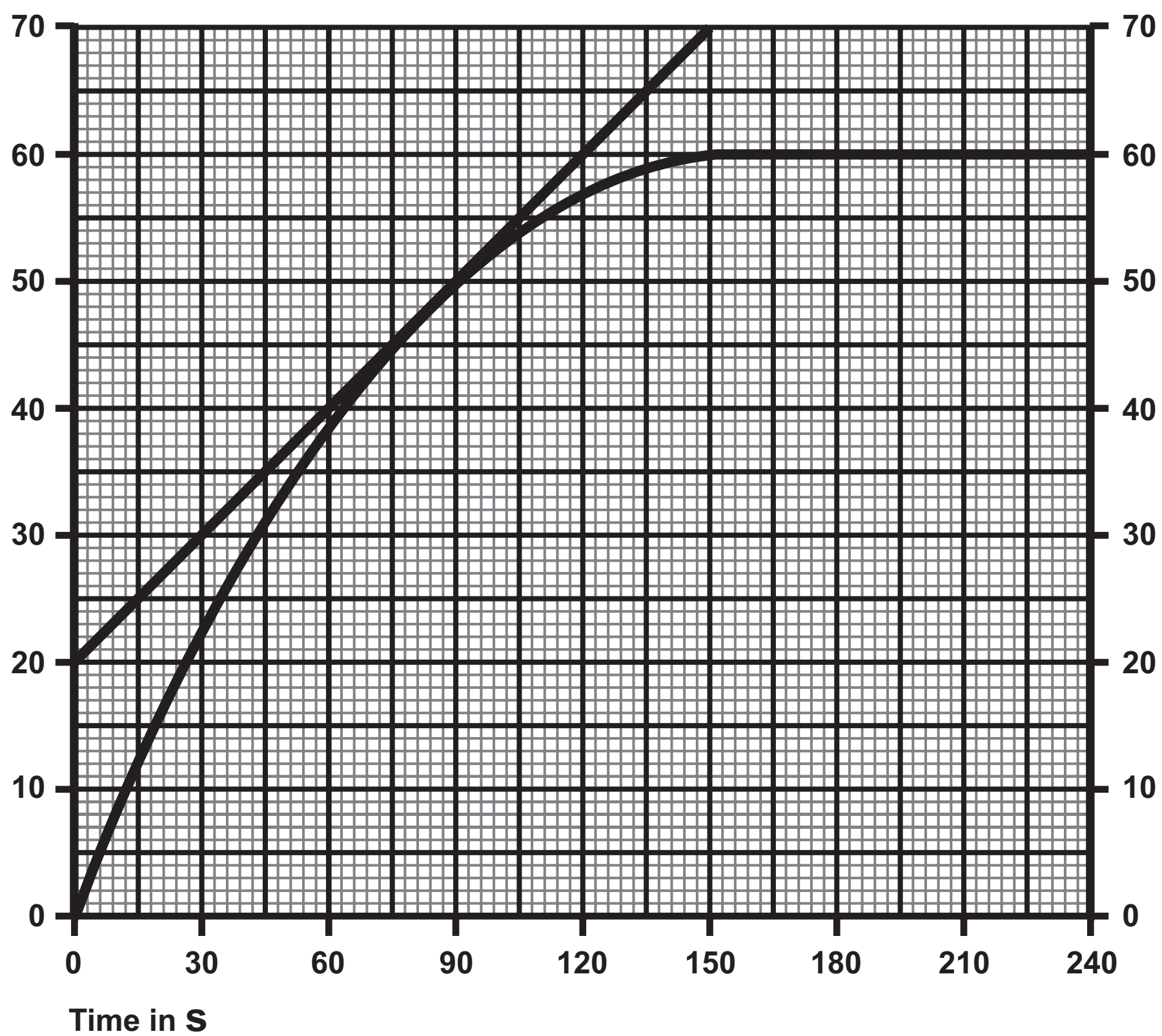
Question 12(b)

Time in hours	Mass of solid in the furnace in kg
0	2510
1	2207
2	1960
3	1506
4	1329
5	1267
6	1267
7	1267

Question 6(b)(i)

temperature of the water at the start in °C	
highest temperature reached in °C	
temperature rise in °C	57.2

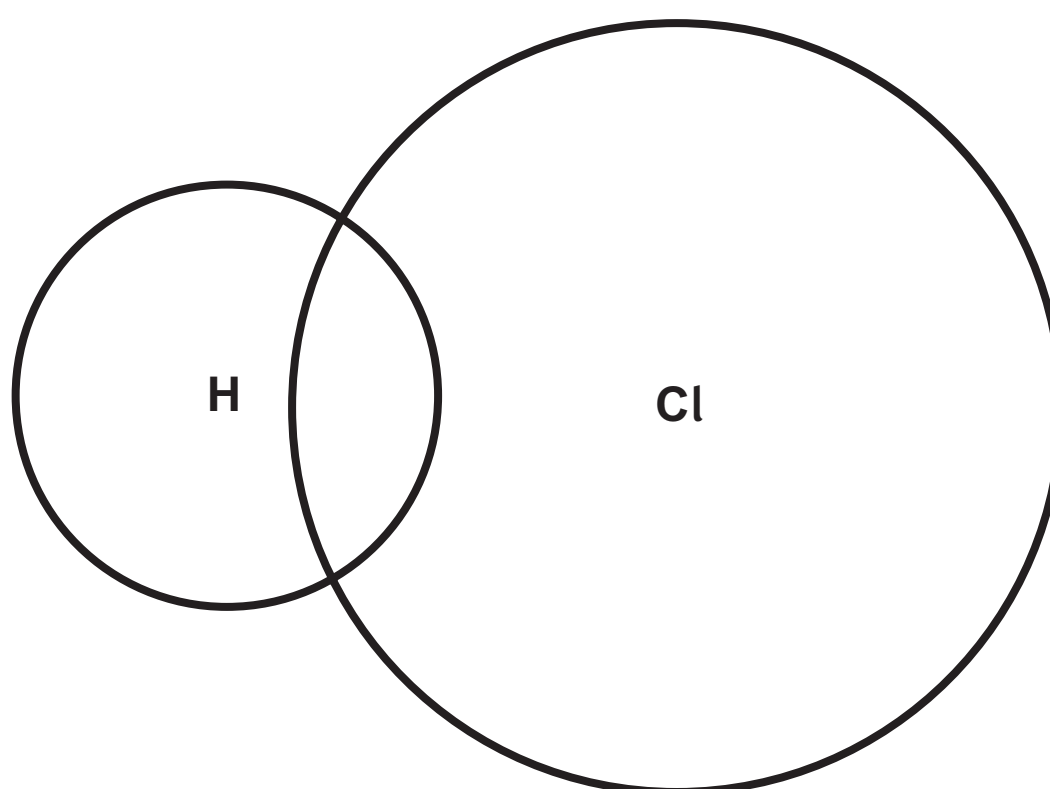
## Question 7(b)

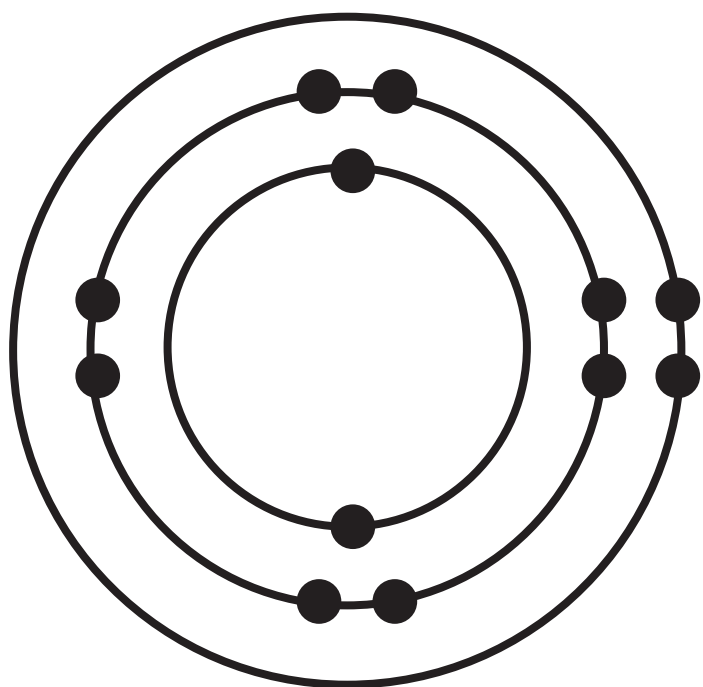
Volume of gas in  $\text{cm}^3$ 



Question 9(a)

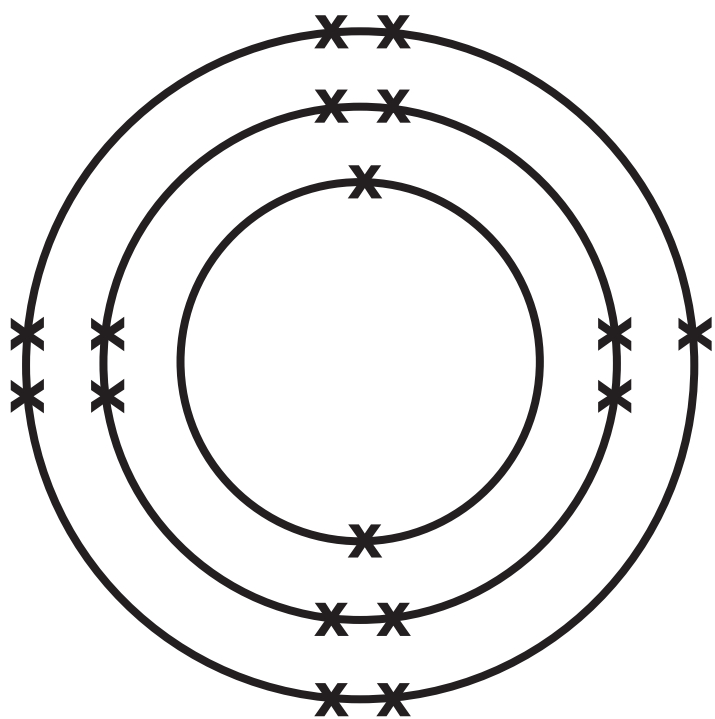
	$\text{Cl}^-$	$\text{O}^{2-}$	$\text{SO}_4^{2-}$
$\text{Na}^+$		$\text{Na}_2\text{O}$	$\text{Na}_2\text{SO}_4$
$\text{NH}_4^+$	$\text{NH}_4\text{Cl}$		
$\text{Zn}^{2+}$	$\text{ZnCl}_2$		$\text{ZnSO}_4$

**Question 9(b)(i)**

**Question 9(b)(ii)****magnesium****magnesium ion**

Question 9(b)(ii) – continued.

chlorine



chlorine ion

