

**Paper 2 (4SS0/1C)**

<b>Question number</b>	<b>Answer</b>	<b>Additional guidance</b>	<b>Mark</b>
<b>1(a)(i)</b>	<p>An explanation that makes reference to the following two points:</p> <ul style="list-style-type: none"> <li>boxes 1 and 2 (1)</li> <li>because they both have only one type of atom/molecule (1)</li> </ul>	<p>accept other indications, e.g. only He and only H-H</p> <p>accept species in place of atom/molecule</p> <p>second mark can be awarded if only box 1 or box 2 identified</p>	<b>2</b>

<b>Question number</b>	<b>Answer</b>	<b>Additional guidance</b>	<b>Mark</b>
<b>1(a)(ii)</b>	<p>An explanation that makes reference to the following two points:</p> <ul style="list-style-type: none"> <li>boxes 3 and 5 (1)</li> <li>box 3 contains a mixture of helium and hydrogen and box 5 contains a mixture of hydrogen and water (1)</li> </ul>	<p>second mark can be awarded if only box 3 or box 5 identified</p>	<b>2</b>

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
<b>1(b)(i)</b>	Simple distillation	<b>1</b>

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
<b>1(b)(ii)</b>	Chromatography	<b>1</b>

<b>Question number</b>	<b>Answer</b>	<b>Mark</b>
<b>1(b)(iii)</b>	Crystallisation	<b>1</b>

**Total for Question 1 = 7 marks**

Question number	Answer	Additional guidance	Mark
2(a)	<ul style="list-style-type: none"> <li>(Ammonia) blue (1)</li> <li>(Chlorine) white/colourless (1)</li> </ul>	ignore red accept bleached	2

Question number	Answer	Mark
2(b)	<p>A description that makes reference to the following two points:</p> <ul style="list-style-type: none"> <li>(hydrogen) burning splint gives a squeaky pop (1)</li> <li>(oxygen) glowing splint relights (1)</li> </ul>	2

Question number	Answer	Mark
2(c)	<p>A description that makes reference to the following four points:</p> <ul style="list-style-type: none"> <li>dip platinum wire in acid (1)</li> <li>then into sodium chloride (1)</li> <li>then into Bunsen flame (1)</li> <li>yellow colour with sodium ion (1)</li> </ul>	4

**Total for Question 2 = 8 marks**

Question number	Answer	Additional guidance	Mark
3(a)(i)	<p>A description that makes reference to any two of the following points:</p> <ul style="list-style-type: none"> <li>• sodium floats/moves across the water (1)</li> <li>• sodium melts/forms a ball (1)</li> <li>• sodium disappears/gets smaller (1)</li> <li>• effervescence/fizzing/bubbles/gas given off (1)</li> <li>• white trail (1)</li> </ul>	accept sodium dissolves ignore name of gas	2

Question number	Answer	Additional guidance	Mark
3(a)(ii)	<p>An explanation that makes reference to the following two points:</p> <ul style="list-style-type: none"> <li>• (final colour is) purple/blue (1)</li> <li>• because the solution is alkaline (1)</li> </ul>	accept sodium hydroxide forms/solution has high pH	2

Question number	Answer	Mark
3(a)(iii)	D	1

Question number	Answer	Additional guidance	Mark
3(b)	Potassium catches fire	accept lilac/purple/violet flame	1

Question number	Answer	Additional guidance	Mark
3(c)	$2\text{Rb} + 2\text{H}_2\text{O} \rightarrow 2\text{RbOH} + \text{H}_2$ (1)	accept multiples and fractions	1

**Total for Question 3 = 7 marks**

Question number	Answer	Additional guidance	Mark
4(a)	Equal numbers of + and – charges/equal numbers of protons and electrons	accept 5 in place of equal	1

Question number	Answer	Mark
4(b)	An explanation that makes reference to the following two points: <ul style="list-style-type: none"> <li>• same number of protons (1)</li> <li>• different numbers of neutrons (1)</li> </ul>	2

Question number	Answer	Mark
4(c)	<ul style="list-style-type: none"> <li>• (Atom 1 mass number) 10 (1)</li> <li>• (Atom 2 atomic number) 5 (1)</li> </ul>	2

Question number	Answer	Mark
4(d)	<ul style="list-style-type: none"> <li>• Setting out of calculation</li> <li>• Evaluation</li> </ul> $((6 \times 7.0) + (7 \times 93.0) \div 100) (1)$ $= 6.9 (1)$	2

**Total for Question 4 =7 marks**

Question number	Answer	Mark
5(a)	X and Z (1)	1

Question number	Answer	Mark
5(b)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> <li>• X has a higher melting point than Z (1)</li> <li>• because covalent bonds need to be broken in X (1)</li> <li>• but intermolecular forces (between molecules) need to be overcome in Z (1)</li> <li>• covalent bonds/bonds in X are strong and intermolecular forces/forces in Z are weak (1)</li> </ul>	4

Question number	Answer	Mark
5(c)	<p>An explanation that makes reference to any two linked of the following points:</p> <ul style="list-style-type: none"> <li>• oppositely charged ions (1)</li> <li>• are strongly attracted to each other (1)</li> <li>• so lot of energy needed to overcome the (strong forces of attraction) (1)</li> </ul>	2

**Total for Question 5 = 7 marks**

Question number	Answer	Additional guidance	Mark
6(a)	<ul style="list-style-type: none"> <li>• 35 (1)</li> <li>• 41 (1)</li> </ul>	final answer consequential on syringe readings	2

Question number	Answer	Additional guidance	Mark
6(b)	<ul style="list-style-type: none"> <li>• Calculation of volume of oxygen used</li> <li>• Calculation of original volume of air</li> <li>• Calculation of percentage</li> </ul> <p>Example calculation:  <math>80 - 43 = 37 \text{ (cm}^3\text{)} (1)</math>  <math>100 + 10 + 80 = 190 \text{ (cm}^3\text{)} (1)</math>  <math>(37 \times 100) \div 190 (= 19.47\%)</math>  <math>= 19\% (1)</math></p>	accept 19.47% or 19.5%	3

Question number	Answer	Mark
6(c)	<ul style="list-style-type: none"> <li>• Decreased (1)</li> <li>• Decreased (1)</li> <li>• No effect (1)</li> </ul>	3

**Total for Question 6 = 8 marks**

Question number	Answer	Additional guidance	Mark
7(a)	thermometer reading at end/°C	(26.8)	1 mark for temperature at start 1 mark for temperature rise consequential on readings
	thermometer reading at start/°C	18.7	
	temperature rise/°C	8.1	
			<b>2</b>

Question number	Answer	Mark
7(b)(i)	29.5	<b>1</b>

Question number	Answer	Mark
7(b)(ii)	20.8	<b>1</b>

Question number	Answer	Additional guidance	Mark
7(c)	<ul style="list-style-type: none"> <li>• Calculation of volume/mass of mixture</li> <li>• Calculation of temperature increase</li> <li>• Substitution of values into <math>q=mc\Delta T</math></li> <li>• Calculation of heat energy released with unit</li> </ul> <p>Example calculation:</p> <p>20.0 + 20.0 = 40.0 (cm<sup>3</sup>) (1)  30.0-18.5 = 11.5 (°C) (1)  <math>q = 40.0 \times 4.2 \times 11.5</math> (1)  <math>q = 1900 \text{ J}</math> (1) (1932 J)</p>	accept 1930 accept answers to three or more significant figures	<b>4</b>

**Total for Question 7 = 8 marks**

Question number	Answer	Mark
8(a)	An explanation that makes reference to the following points: <ul style="list-style-type: none"> <li>(all) contain carbon and hydrogen (1)</li> <li>only/but no other elements (1)</li> </ul>	2

Question number	Answer	Mark
8(b)	(The only one that shows) all atoms and all bonds	1

Question number	Answer	Mark
8(c)	A, C, D and F	1

Question number	Answer	Mark
8(d)(i)	( $C_3H_8 + 5O_2 \rightarrow 3CO_2 + 4H_2O$ ) <ul style="list-style-type: none"> <li>1 mark for both product formulae correct (1)</li> <li>1 mark for balancing (1)</li> </ul>	2

Question number	Answer	Additional guidance	Mark
8(d)(ii)	An explanation that makes reference to the following points: <ul style="list-style-type: none"> <li>sulfur dioxide reacts with water (1)</li> <li>to form an acid (1)</li> </ul>	accept sulfuric or sulfurous	2

**Total for Question 8 = 8 marks**

**TOTAL FOR PAPER = 60 MARKS**