

Group one metals Past Paper Answers IGCSE Edexcel

1.

Question number	Answer	Notes	Marks
(a) (i)	Any two from: <b>M1</b> sodium gets smaller /disappears <b>M2</b> sodium moves/darts around <b>M3</b> white trail <b>M4</b> melts/forms a ball <b>M5</b> litmus/solution/liquid turns blue	<b>ALLOW</b> dissolves  <b>IGNORE</b> floats fizzing/bubbles/ effervescence <b>IGNORE</b> references to flames / sparks / heat produced / explodes	2
(ii)	$2 \text{Na(s)} + 2 \text{H}_2\text{O(l)} \rightarrow 2 \text{NaOH(aq)} + (1) \text{H}_2\text{(g)}$ <b>M1</b> correct balancing <b>M2</b> correct state symbols	<b>ALLOW</b> multiples and fractions	2
(b) (i)	(both) contain one electron in the outer(most)/valence shell	<b>ALLOW</b> same number of electrons in the outer(most) shell	1
(ii)	(most reactive) potassium/K sodium/Na  (least reactive) lithium/Li		1

2.

Question number	Answer	Notes	Marks
(a)	<p><b>M1</b> (X) - chlorine</p> <p><b>M2</b> (Y) - potassium hydroxide</p> <p><b>M3</b> (Z) - hydrochloric (acid)</p>	<p>ACCEPT Cl<sub>2</sub> IGNORE Cl</p> <p>ACCEPT KOH</p> <p>ACCEPT HCl</p> <p>In each case, if both name and formula given then mark name only</p>	3
(b) (i)	2Na + I <sub>2</sub> → 2NaI	<p>ACCEPT multiples and halves IGNORE state symbols</p> <p>correct case/subscript required</p>	1
(ii)	<p><b>M1</b> add (dilute) nitric acid</p> <p><b>M2</b> add (aqueous) silver nitrate</p> <p><b>M3</b> yellow precipitate (forms)</p>	<p>ACCEPT HNO<sub>3</sub></p> <p>If no acid then M2 and M3 can be scored If incorrect acid or other incorrect reagent then M2 and M3 can be scored</p> <p>ACCEPT AgNO<sub>3</sub></p> <p>If more than two reagents added penalise extra incorrect reagent(s)</p> <p>ACCEPT usual alternatives to precipitate</p> <p>IGNORE cloudy IGNORE qualifiers such as pale/light/dark REJECT other observations e.g. fizzing</p> <p><b>M3</b> DEP on addition of silver nitrate/ AgNO<sub>3</sub> IGNORE identity of precipitate</p> <p>If use more reactive halogen (solution) ALLOW M1 add chlorine/bromine (solution) M3 turns (reddish) brown</p> <p>OR M1 add chlorine/bromine (solution) M2 (followed by) starch M3 turns blue/black</p> <p>IGNORE references to electrolysis</p>	3

3.

Question number	Answer	Notes	Marks
i (a)	<p><b>B</b> (changes from shiny to dull)</p> <p><b>The only correct answer is B</b></p> <p>A is not correct because a freshly exposed surface of lithium does not bubble and fizz when in contact with air</p> <p>C is not correct because a freshly exposed surface of lithium does not burst into flame when in contact with air</p> <p>D is not correct because a freshly exposed surface of does change when in contact with air</p>		1
(b) (i)	<p>burns with a pop/squeak</p> <p><b>OR</b></p> <p>use burning/lit spill to see if pops/squeaks</p> <p><b>OR</b></p> <p>use flame to see if pops/squeaks</p>	<p>Must be reference to test and result</p> <p>Reference to spill/match with no indication of flame is not enough</p> <p><b>REJECT</b> reference to glowing spill/splint</p> <p><b>IGNORE</b> flame extinguished</p> <p>'Squeaky pop test' alone is not sufficient</p>	1

(ii)	<p><b>M1</b> lithium hydroxide/LiOH/hydroxide <u>ion(s)</u>/OH<sup>-</sup> (formed)</p> <p><b>M2</b> (therefore) the <u>solution</u> is alkaline</p>	<p>If both name and formula given both must be correct</p> <p><b>ACCEPT</b> pH is of the <u>solution</u> greater than 7</p> <p><b>ALLOW</b> <u>solution</u> is basic</p>	2
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4.

Question number	Answer	Notes	Marks												
a i	<table border="1"> <thead> <tr> <th>Atomic number</th> <th>Mass number</th> <th>Number of protons</th> <th>Number of neutrons</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>19</td> <td>20</td> </tr> <tr> <td>19</td> <td>41</td> <td></td> <td></td> </tr> </tbody> </table>	Atomic number	Mass number	Number of protons	Number of neutrons			19	20	19	41			<p><b>M1</b> for 19 protons in top row AND atomic number of 19</p> <p><b>M2</b> for 20 neutrons in top row</p> <p><b>M3</b> for mass number of 41</p>	3
Atomic number	Mass number	Number of protons	Number of neutrons												
		19	20												
19	41														
ii	<p><b>M1</b> <math>(6 \times 0.074) + (7 \times 0.926)</math></p> <p><b>M2</b> = 6.9</p>	<p><b>ACCEPT</b> <math>\frac{(6 \times 7.4) + (7 \times 92.6)}{100}</math></p> <p>Answer must be to 1 dp Correct final answer without working scores 2 marks</p>	2												
b	<p>any two from</p> <ul style="list-style-type: none"> <li>effervescence/fizzing/bubbles</li> <li>potassium moves/darts/floats</li> <li>potassium leaves white trail</li> <li>potassium forms into a ball</li> <li>potassium becomes smaller/disappears</li> <li>(lilac) flame</li> </ul>	<p><b>ACCEPT</b> (hydrogen) gas given off/evolved/formed/produced <b>IGNORE</b> name of gas</p> <p><b>ACCEPT</b> melts</p> <p><b>ACCEPT</b> dissolves</p> <p><b>IGNORE</b> colour of flame / explodes</p>	2												

Question number	Answer	Notes	Marks
c i	pink	<p><b>ALLOW</b> red</p> <p><b>IGNORE</b> purple</p>	1
ii	OH <sup>-</sup> / HO <sup>-</sup>		1
d	<p><b>M1</b> potassium loses its outer/valence electron more easily/readily</p> <p><b>M2</b> because it is further from (the attraction of) nucleus (and therefore less strongly attracted to the nucleus)</p>	<p><b>IGNORE</b> references to more shells / larger atomic radius / more shielding / more screening</p> <p><b>ACCEPT</b> reverse arguments as long as it is clear that lithium is being considered</p>	2

5.

Question number	Answer	Notes	Marks
a	C (lithium reacts with water to form an alkali)		1
b	A (have the same number of outer shell electrons)		1
c	(similar) bubbles / fizzing / effervescence OR moves / darts / floats OR gets smaller / disappears potassium shows a flame / sparks / explodes OR potassium melts / forms ball	Accept gas given off /evolved/formed/produced Accept hydrogen <u>gas</u> Ignore identity of gas  Accept dissolves Accept reverse arguments for lithium	1      1
d	K <sub>2</sub> O  KCl	Accept K <sub>2</sub> O <sub>2</sub> and KO <sub>2</sub> Reject KO  If formula shown as <u>product</u> of an equation, ignore reactants and balancing Ignore coefficients	1   1
e	s    l    aq    g		1
f	85 AND 87 calculated (even if not identified) (85 × 0.72) + (87 × 0.28) = 85.6	Accept 37+48 and 37+50 Correct final answer = 2 marks 85.5 or 85.56 = 1 mark No ECF from incorrect mass numbers Ignore units	1 1

6.

Question number	Answer		Notes	Marks
(a)	<b>Description of reaction</b>	<b>Metal</b>	3 correct = 2 marks 1 correct = 1 mark  accept symbols	2
	it explodes on contact with water	caesium		
	it fizzes gently	lithium		
	it reacts violently and forms a lilac flame	potassium		
(b) (i)	<b>M1</b> – hydrogen		ignore symbol or formula even if incorrect	1
	<b>M2</b> – H <sub>2</sub>		reject H accept H <sub>2</sub> (g) as a <u>product</u> in an equation  ignore name even if incorrect accept LiOH as a <u>product</u> in an equation	1
(ii)	<b>M1</b> – lithium hydroxide		ignore formula even if incorrect	1
	<b>M2</b> – LiOH		ignore name even if incorrect	1
(iii)	<b>M1</b> – add (red) litmus		accept any named indicator	1
	<b>M2</b> - turns blue		accept correct colour for named indicator ignore purple	1
	OR			
	<b>M1</b> – use a pH meter / measure pH			
<b>M2</b> - pH > 7		M2 DEP on M1 do not award <b>M1</b> or <b>M2</b> if blue litmus is used		
<b>Total 8 marks</b>				

7.

Question number	Answer	Notes	Marks
a	C (lithium reacts with water to form an alkali)		1
b	A (have the same number of outer shell electrons)		1
c	(similar) bubbles / fizzing / effervescence OR moves / darts / floats OR gets smaller / disappears potassium shows a flame / sparks / explodes OR potassium melts / forms ball	Accept gas given off /evolved/formed/produced Accept hydrogen <u>gas</u> Ignore identity of gas  Accept dissolves Accept reverse arguments for lithium	1       1
	d	K <sub>2</sub> O  KCl	Accept K <sub>2</sub> O <sub>2</sub> and KO <sub>2</sub> Reject KO  If formula shown as <u>product</u> of an equation, ignore reactants and balancing Ignore coefficients
e	s l aq g		1
f	85 AND 87 calculated (even if not identified) (85 × 0.72) + (87 × 0.28) = 85.6	Accept 37+48 and 37+50 Correct final answer = 2 marks 85.5 or 85.56 = 1 mark No ECF from incorrect mass numbers Ignore units	1
			1
<b>Total 9 marks</b>			

8.

Question number	Answer	Notes	Marks	
a	C (good electrical conductor... and basic oxide)		1	
b	i	effervescence / fizzing / bubbles  sodium moves / darts / floats sodium melts / forms a ball sodium becomes smaller / disappears white trail	Accept gas given off /gas evolved / gas formed / gas produced Accept wrongly identified gas Accept equivalents such as shoots/skims  Accept dissolves Ignore white precipitate Do not apply list principle Assume that it = sodium Ignore flames/sparks Any two for 1 each	2
	ii	l aq g		1 1
c	hydrogen/gas/potassium burns / flame / fire / sparks	Accept explodes Ignore references to more vigorous reaction / more fizzing	1	
d	(all have) 1 electron in outer shell	Accept (all have) same number of outer electrons	1	

9.

Question number	Answer	Accept	Reject	Marks
(a)	<b>M1</b> electronic configuration / 2.1, 2.8.1, 2.8.8.1	electronic structure / arrangement of electrons		1
	<b>M2</b> same number of electrons in outer shell / one electron in outer shell			1
	<b>OR</b> the number of electrons in the outer shell determines the chemical properties			
(b)	melting point / melting temperature			1
(c)	(i) burns with a pop/squeak (when mixed with air and ignited)	use burning/lit spill / flame to see if pop/squeak splint for spill  capital letters  OH <sup>-</sup> for hydroxide ions pH is greater than 7	glowing spill just 'squeaky pop test'	1
	(ii) s l aq g			1
	(iii) <b>M1</b> turns blue <b>IGNORE</b> purple			1
	<b>M2</b> alkaline solution formed/alkali formed/hydroxide ions formed/LIOH is an alkali/LIOH forms hydroxide ions <b>IGNORE</b> references to lithium hydroxide is a metal hydroxide <b>M2</b> dep on <b>M1</b> correct or missing			1



(d)	Similarities - any two from: <ul style="list-style-type: none"> <li>floats</li> <li>moves around</li> <li>fizzes/effervesces/bubbles/produces gas/produces hydrogen</li> <li>disappears/dissolves</li> <li>forms a solution</li> </ul>	forms an alkali/forms a hydroxide  react vigorously  exothermic/gives out heat		2
	Differences - any two from: Potassium: <ul style="list-style-type: none"> <li>more vigorous/move around faster/reacts faster/fizzes more/explodes</li> <li>flame (<b>IGNORE</b> colour)/catches fire</li> <li>forms a ball/bead/melts</li> </ul>			reverse arguments for lithium  comparison between the two, eg only potassium catches fire, they react at different rates