


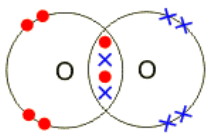
Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
7	1	(a)	(i)		2	E (1) two shells occupied / containing electrons (1)	Ne		
			(ii)		2	B and E (1) both have full outer shells of electrons (1)	Ar and Ne 8 electrons in outer shell		
			(iii)		1		2		
		(b)			2	electronic structure is 2,8,7 therefore 17 electrons / atomic number is 17 (1) number of electrons is equal to number of protons (1) both marks may be credited for one statement e.g. total number of electrons is equal to number of protons / contains 17 electrons therefore nucleus contains 17 protons (2)		any reference to adding number of electrons in each shell	

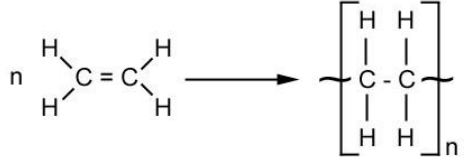
Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT								
8	2	(a)			2	pH6 – should be pH 11-12 (or alkaline) (1) burns with an orange flame – should be lilac flame (1)	8-14 / above 7 lithium with implication that reaction should be more rapid (but less rapid than reaction of sodium)		7 or above
		(b)			4	flame test (1) yellow flame (1) (add) silver nitrate (solution) (1) white precipitate (1) must have correct test for observation mark to be awarded	orange flame		

Question Number									
FT	HT	Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
9	3	(a)			2	AlCl ₃ (1) formula must be correct to get balancing mark 2,3,2 (1)			
		(b)	(i)		2	102 (2) if incorrect allow (1) for (27 x 2) + (16 x 3) no ecf within part (i)			
			(ii)		1	47 ecf possible from part (i)	47.1		

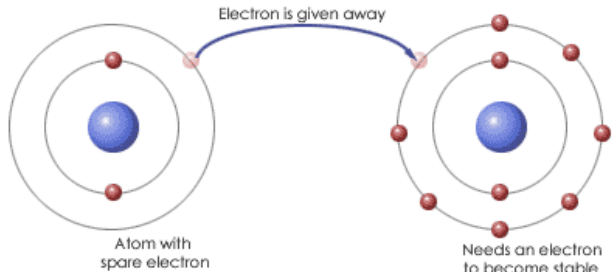
Question Number		Mark	Answer
FT	HT		
10	4	6	<p>Indicative content: how it is carried out – spot of each ink on pencil line and dip end of paper in water, leave for water to rise up paper what happens – water dissolves ink and carries the components different distances according to their solubilities, appear as spots/streaks on paper / as chromatogram results – if inks contain the same pigments, the pattern of spots would be identical; different pattern if inks contain different pigments</p> <p>5-6 marks: The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks: The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks: The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks: The candidate does not make any attempt or give a relevant answer worthy of credit.</p>

Question Number		Sub-section			Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT	(a)	(i)		1	84 – no tolerance			
	5		(ii)		2	32 (2) ecf possible from part (i) if incorrect award (1) for 16 or 200 – 168			
		(b)			3	both increase with temperature (1) R R - must have this for full marks any 2 of the following for (1) each KNO ₃ non-linear increase/curve and KBr linear increase/straight line (1) solubilities the same at 50°C (1) below 50°C solubility of KNO ₃ is lower than KBr or above 50°C solubility of KNO ₃ is higher than KBr (1) solubility of KNO ₃ increases more than solubility of KBr (1)			

Question Number								
FT	HT	Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
	6	(a)		3	<p>many strong bonds in all directions in diamond (1)</p> <p>lots of energy needed to separate atoms / break bonds (1)</p> <p>weak bonds between molecules therefore less energy needed to separate them (1)</p>	hydrogen is simple molecular but diamond is giant covalent for (1) if no other credit awarded		
		(b)		2	<p>thermal/electrical conductivity (1)</p> <p>free moving / delocalised electrons between layers (1)</p> <p>or</p> <p>slippery / soft (1)</p> <p>layers able to move over each other / weak bonds / forces between layers (1)</p> <p>must have property for explanation mark to be awarded</p>			brittle
		(c)		2	<p>two shared pairs of electrons (1)</p> <p>outer shells of both atoms complete (1)</p>  <p>must have double bond to be awarded second mark</p>			

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT	(a)	(i)	2	$C_2H_4 + Br_2$ (1) $C_2H_4Br_2$ (1)			
	7		(ii)	1	orange solution turns colourless			ethene goes colourless
		(b)	(i)	3	 <p>(3) for correct equation</p> <p>otherwise double bond breaks in ethene (1) large number of molecules join together (1) to form a long chain polymer (1)</p>			
			(ii)	2	speeds up the rate of the reaction (1) reduces energy required (for collision to be successful) (1)	reduces activation energy		
		(c)		4	A = thermoplastic / thermosoftening plastic B = thermoset both needed for (1) weak or no bonds between chains in A (1) bonds formed between chains in B (1) allowing chains of A to move over each other / chains of B cannot move over each other (1)	crosslinks		award (2) max for explanation if any reference to layers

Question Number		Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
FT	HT							
	8	(a)		3	$M_r(\text{NaHCO}_3) = 84$ and $M_r(\text{Na}_2\text{CO}_3) = 106$ (1) 2 : 1 ratio (1) $126 \rightarrow 79.5\text{g}$ (1) award (3) for cao			
		(b)		2	$70/79.5$ (1) 88.05 (1) ecf possible from part (a)			

Question Number		Mark	Answer
FT	HT		
	9	6	<p>Indicative content:</p> <p>diagram showing bonding in lithium chloride with no ambiguity</p>  <p>to form Li^+ and Cl^- (outer electrons only need be shown)</p> <p>description of bonding in words i.e. lithium atom loses an electron to become a positive ion, chlorine atom gains an electron to become a negative chloride ion, strong force of attraction between oppositely charged ions; high melting point due to strong bonds between the ions; conducts electricity when molten or in solution as charged ions are free to move; does not conduct when solid as ions are immobile</p> <p>5-6 marks: The candidate constructs an articulate, integrated account correctly linking relevant points, such as those in the indicative content, which shows sequential reasoning. The answer fully addresses the question with no irrelevant inclusions or significant omissions. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.</p> <p>3-4 marks: The candidate constructs an account correctly linking some relevant points, such as those in the indicative content, showing some reasoning. The answer addresses the question with some omissions. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.</p> <p>1-2 marks: The candidate makes some relevant points, such as those in the indicative content, showing limited reasoning. The answer addresses the question with significant omissions. The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.</p> <p>0 marks: The candidate does not make any attempt or give a relevant answer worthy of credit.</p>