

Mark Scheme - 1.1 The Nature of Substances and Chemical Reactions



1.

Mark	Answer
6 QWC	<p>Indicative content</p> <ul style="list-style-type: none">• element has a mass number of 35 and atomic number of 17• 17 protons given by atomic number; must have same number of electrons because atoms are neutral• 17 electrons arranged in shells; electronic structure 2, 8, 7• element is in Period 3; number of occupied electron shells• element is in Group 7; number of electrons in the outer shell• element E is chlorine• number of neutrons is 18; difference between mass number and atomic number <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>




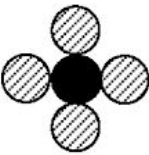
2.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		2	negative / -1 (1) 1 (1)			
(b)		1	19 9 – both needed			
(c)		2	17 (1) 20 (1)			
(d)		1	2,8,1			
(e)		1	2,8,8,2			

3.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)	1	aluminium and sodium (both needed)	Al and Na		
	(ii)	1	nitrogen dioxide and water (both need)	NO ₂ and H ₂ O		
	(iii)	1	crude oil			
(b)	(i)	1	A			
	(ii)	I	1			
		II	1			
	(iii)	I	1	1		
		II	1	6		

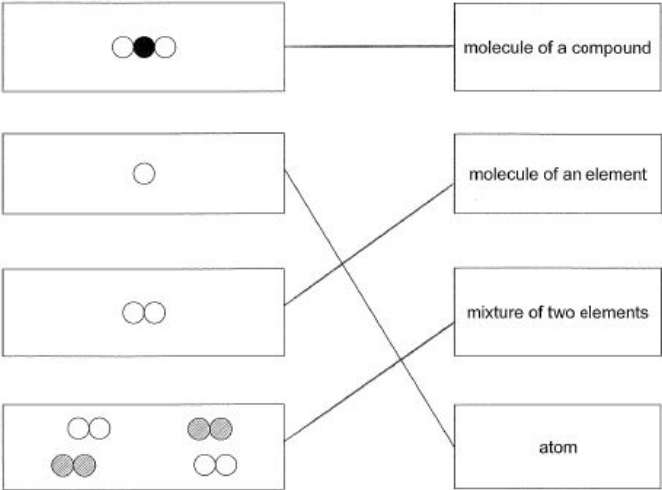
4.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		3	calcium and chlorine (1) copper(II) oxide / copper oxide (1) MgBr ₂ (1)		Ca and Cl / Cl ₂	
(b)	(i)	1	carbon  oxygen  both needed			
	(ii)	I				
		II		follow through (ft) from (b)(i)		




5.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		3	A (1) D (1) C (1)			
(b)		2	NH ₃ (1) Mg ²⁺ (1)	ammonia magnesium		



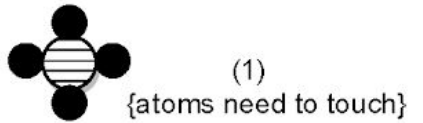

6.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	2	 <p>all three correct for (2) any one for (1)</p>			
(b)	2	<p>A electron negative B nucleus positive</p> <p>all four correct for (2) any two for (1)</p>			



7.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		4	calcium oxide (1) 2 (1) copper and sulfur (1) Na ₂ O (1)			
(b)		2	 hydrogen  oxygen  carbon all three correct for (2) any two for (1)		symbols	

8.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)		1	calcium and chlorine - both needed		Ca and Cl	chloride
(b)		1	sodium/magnesium/aluminium	Na/Mg/Al		
(c)	(i)	1	nitrogen		N	
	(ii)	2	eg hydrogen  carbon  (1)			
						
(d)		1	H_2CO_3	CO_3H_2		

9.

Sub-section		Mark	Answer	Accept	Neutral answer	Do not accept
(a)	(i)	1	 <i>atoms must be touching</i>			
	(ii)	1	NH ₃	H ₃ N		
(b)	(i)	1	O ₂ / He / Ne <i>any two</i>	oxygen / helium / neon		O
	(ii)	1	CO ₂ / CH ₄ / SO ₂ <i>any two</i>	carbon dioxide / methane / sulfur dioxide		
(c)	(i)	1	1			
	(ii)	1	5			
(d)	(i)	1	Mg ²⁺ Cl ⁻ <i>both ions needed (including charges)</i>	2Cl ⁻		Cl ₂ ⁻
	(ii)	1	NaOH	Na ⁺ OH ⁻		

10.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	1	horse C			
(b)	1	no, none have a spot corresponding to caffeine	no samples match caffeine		
(c)	2	3 (1) R _f value = 0.3 (1) correct answer only (cao) – 2 marks ft incorrect 'distance moved' only if value given divided by 10 i.e. correct distance moved by solvent – 1 mark			

11.

Sub-section	Mark	Answer	Accept	Neutral answer	Do not accept
(a)	1	purple and yellow both needed			
(b)	2	0.4 × 10 (1) 4 (1) award (2) for correct answer only (cao) no error carried forward (ecf)			
(c)	1	(food colourings are) soluble (in water) / (food colouring) dissolve (in water)			