



Rewarding Learning

General Certificate of Secondary Education
2010–2011

Science: Double Award (Modular)

Using Materials and Understanding Reactions
End of Module Test

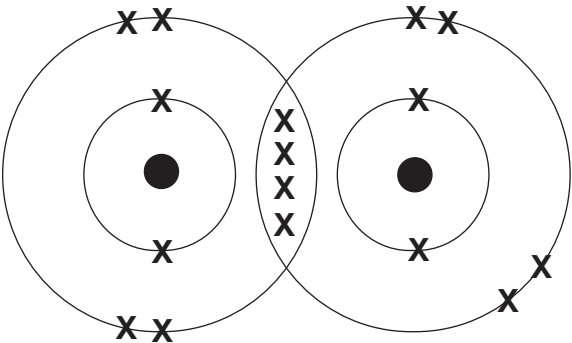
Higher Tier

[GDB02]

WEDNESDAY 10 NOVEMBER 2010, AFTERNOON

**MARK
SCHEME**

			AVAILABLE MARKS																					
1	(a)	K	[1]	4																				
	(b)	24	[1]																					
	(c)	3	[1]																					
	(d)	Calcium hydrogen carbonate	[1]																					
2	(a)	Diffusion	[1]	4																				
	(b)	Takes longer to form the white ring	[1]																					
	(c)	Idea that ammonia (particles) diffuses/moves faster/ hydrochloric acid (particles) diffuses/moves more slowly accept idea that ammonia is less dense/hydrochloric acid is more dense	[1]																					
	(d)	NH ₄ Cl	[1]																					
3	(a)	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Particle</th> <th>Atomic Number</th> <th>Mass Number</th> <th>Electronic arrangement</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>6</td> <td>12</td> <td>2,4</td> </tr> <tr> <td>B</td> <td>1</td> <td>2</td> <td>1</td> </tr> <tr> <td>C</td> <td>5</td> <td>11</td> <td>2,3</td> </tr> <tr> <td>D</td> <td>1</td> <td>3</td> <td>1</td> </tr> </tbody> </table>	Particle	Atomic Number	Mass Number	Electronic arrangement	A	6	12	2,4	B	1	2	1	C	5	11	2,3	D	1	3	1	[4]	6
Particle	Atomic Number	Mass Number	Electronic arrangement																					
A	6	12	2,4																					
B	1	2	1																					
C	5	11	2,3																					
D	1	3	1																					
	(b)	(i) B and D	[1]																					
		(ii) the particles have the same atomic number but different mass numbers	[1]																					
4	(a)	cathode	[1]	3																				
	(b)	graphite/carbon	[1]																					
	(c)	high cost/idea of needing a lot of energy/anodes need to be replaced	[1]																					

		AVAILABLE MARKS
5	(a) Acid – sulphuric acid base – copper oxide/copper hydroxide product – water	[1] [1] [1]
	If copper carbonate is used as the base it gains the mark for base but must state water and carbon dioxide for one mark for the product.	
	(b) Carbon Dioxide	[1] 4
6	idea of Mg atom losing 2 electrons	[1]
	idea of F atom gaining 1 electron	[1]
	idea of 2 F atoms needed to allow Mg to lose 2 electrons (third mark dependent on first two)	[1] 3
7	(a)	
		
	Correct sharing Correct number of electrons (second mark dependent on first)	[1] [1]
	(b) Idea of sharing electrons/covalent bonding Idea of correct 2:1 ratio	[1] [1] 4
8	(a) It combines the properties of two or more materials to form a better more useful material	[1] [1]
	(b) carbon fibre reinforced plastic is less dense/lighter than steel/aluminium it will need less fuel or idea of greater efficiency	[1] [1]
	(c) Idea of (initial) cost.	[1] 5
9	$H^+_{(aq)} + OH^-_{(aq)} \longrightarrow H_2O_{(l)}$	
	[1] for left hand side [1] for right hand side [1] for state symbols	[3] 3

		AVAILABLE MARKS
10	$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$	[1]
	$\frac{20 \times 100}{300} = \frac{22 \times 80}{T_2}$	[1]
	$T_2 = \frac{22 \times 80 \times 300}{20 \times 100}$	
	$T_2 = 264 \text{ K}$	[1]
	For correct answer award [3] up to [2] available for method	3
11	(a) it has a giant structure The bonds between the atoms are very strong/Difficult to break	[1] [1]
	(b) graphite has a layer structure this allows the atoms to slide over each other	[1] [1]
12	Hard water contains calcium ions which are replaced by sodium ions/hydrogen ions which do not cause hardness	[1] [1] [1]
13	(a) hydrogen gas	[1]
	(b) $2 \text{Cl}^- - 2\text{e}^- \longrightarrow \text{Cl}_2$ or $2\text{Cl}^- \longrightarrow \text{Cl}_2 + 2\text{e}^-$	[2]
	[1] [1]	
	(c) sodium hydroxide	[1]
Total		50