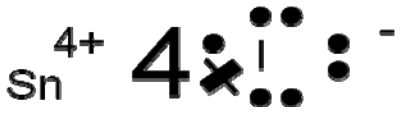
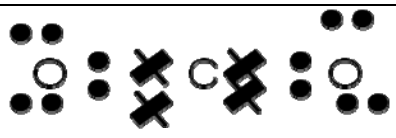
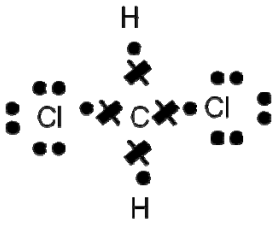
2012 Secondary Three Block Test 2 (Chemistry) **Marking Scheme**

Section A

1	**B**	**6**	**C**	**11**	**D**
2	**B**	**7**	**D**	**12**	**A**
3	**C**	**8**	**A**	**13**	**C**
4	**A**	**9**	**D**	**14**	**D**
5	**D**	**10**	**C**	**15**	**C**

Section B & C

No	Answers	Marks
B1 (a)	Diamond: Macromolecular Tin iodide: crystal lattice/ giant ionic lattice	1 1
(b)	Carbon dioxide is a simple molecular compound with weak intermolecular forces of attraction. (1m) Diamond is a giant covalent substance with strong covalent bonds between the atoms of carbon, forming a macromolecular structure. (1m) More energy is needed to break the strong covalent bond. *(1m for energy comparison)*	3
(c)	Copper has a "sea" of delocalized electrons that can help to conduct electricity.	1
	Accept Sec 2 dot and cross diagrams. Please note that sec 2 dot and cross diagrams will NOT be accepted for EOY	
(d)		1
(e)		1
B2(a)	84, 86, 88	1

No	Answers	Marks
(b)	Average relative molecular mass = 9/16 x 84 + 6/16 x 86 + 1/16 x 88 =85 (1m) The dichloromethane on the fibre found in the crime scene also has an average relative molecular mass of 85 *(correct explanation 1m)* and so the suspect is the criminal. (1m)	3
(c)		1
B3	Release both gases at the same starting point in a test tube and use moist red litmus paper and moist blue litmus paper to test. *(correct method 1m)* Ammonia has a relative molecular mass of 36.5 while sulfur dioxide has a higher relative molecular mass of 64 and so ammonia has a higher diffusion rate. *(correct explanation for the difference in diffusion rates between ammonia and sulfur dioxide 1m)* Ammonia has a higher diffusion rate and so the moist red litmus paper turned blue first. **OR** Sulfur dioxide has a lower diffusion rate and so the moist blue litmus paper turned red later. *(correct observation to determine diffusion rate 1m)*	3
	<u>For mole concept calculations, accept 6/6.02/6.023 x 10^{23}</u>	
B4(a)	Empirical formula = PQ_3, molecular formula = $(PQ_3)_n$ Relative molecular mass from empirical formula =(12 + 3x1) = 15 n= 30/15 = 2 molecular formula = $(PQ_3)_2$ = P_2Q_6	1
B4(b)	No. of moles of gas = 48/24 = 2 moles Mass of gas = 2 x (12x2 + 1x6) = 60 g	1 1

No	Answers	Marks
B4(c)	Number of particles in 2 moles = 2 x 6.02 x 10^{23} = 1.204x10^{24}	1
C1(a)(i)	No. of moles of antimony = 40.0/122 = 0.3279 mol~ 0.328mol	1
(a)(ii)	No. of moles of atoms in oxygen = 7.9/16 = 0.49375 mol	1
(a)(iii)	Mole ratio Sb:O =0.3279: 0.49375 =1:1.5 =2:3 Formula is Sb_2O_3. $4Sb\ (s) + 3O_2\ (g) \rightarrow 2Sb_2O_3\ (s)$ OR $4Sb\ (s) + 3O_2\ (g) \rightarrow Sb_4O_6\ (s)$	4
(b)	Mass of antimony oxide = 0.2 x (122x2 + 16x3) (1m) = 58.4 g (1m) OR Mass of antimony oxide = 0.2 x (122x4 + 16x6) (1m) = 116.8 g (1m)	2
(c)	I agree with the student. (1m) Sb_xO_y is the empirical formula, $Sb_{2x}O_{2y}$ is the molecular formula. (1m)	2

END OF MARKING SCHEME