S3E 2022 WA1 Answers

Section A [5 marks]

1	2	3	4	5
D	А	С	С	В

Section B [30 marks]

B1 (a)	C (no mark)		
	It has accepted 1 electron./The number of protons and electrons		
	differ./The number of electrons is bigger than the number of protons.	1	
(b)	A and B are isotopes.		
	Both have the same number of protons (17) but different number of		
	neutrons (18 for A and 20 for B).	1	
(c)			
	$\begin{bmatrix} 2 & 4 & 4 \\ 0 & 4 & 4 \\ 0 & 1 & 1 \\ 2 & 8 & 8 \end{bmatrix}^{2+}$		
	correct charges (1)	•	
	correct ratio of ions (1)	3	
	Anno Constante efe	0	
B2 (a)	Any 6 points of: in steam, particles/molecules are far apart in water, particles/molecules are close together in steam more randomness in arrangement of particles/molecules in steam, particles/molecules are moving very fast in water, particles/molecules are moving slowly / sliding over each other in steam, the attractive forces between particles are very weak in water, the attractive forces between particles are strong NOTE: answer must show a comparison e.g. particles/molecules are furth <u>er</u> apart in steam (than in water) = 2 points, particles/molecules move fast <u>er</u> in steam (than in water) = 2 points NOT: implication of particles 'apart' in liquids	3	
(b)(i)	boiling (NOT: evaporation)	1	
(ii)	B to C	1	

B3 (a)	number of electrons in outer shell gives the group number (1) 2		
	number of shells (containing electrons) gives the period number (1)		
(b)	54 e	1	
	82 n	1	
	56 p	1	
(c)(i)	2.8	1	
(ii)		3	
	2 Al 3+ 3= 3+ 3= 3+ 3= 3+ 3= 3+ 3= 3= 3= 3= 3= 3= 3= 3= 3= 3= 3= 3= 3=		
	correct oberges (1)		
	correct charges (1)		
	correct ratio of ions (1)		
B4(a)	sum/number of protons and neutrons	1	
(1)	ALLOW: particles in the nucleus		
(D)	reverse argument)	1	
(c)	Argon has a nucleon (mass) number of 40, which is double that of neon (20)	1	
	Average speed of argon particles is 400 ms ⁻¹ , while average speed of neon particles is 550 ms ⁻¹ .	1	
	550 / 2 \neq 400 (hence student's statement is incorrect).	1	
(d)(i)	Anywhere on the right side of the tube	1	
	HCI has a larger nucleon (mass) number than CH ₃ NH ₂ , and so	1	
	diffuses (NOT: move) more slowly (and travels shorter distance).	1	
(ii)	Similarity: A <u>white solid is formed</u> in both experiments. / A white solid is formed nearer to HCI in both experiments.	1	
	Difference: The <u>white solid is formed</u> more quickly in Experiment 2 than in Experiment 1 / A shorter time taken for the white solid to form in Experiment 2 than in Experiment 1.	1	
	NOT: the gases diffuse faster / react more quickly (these are NOT observations)		