

Question number	Expected Answer	Accept	Reject	Marks
1 (a)	M1 both protons = 6 M2 C-13 has 7 and C-14 has 8 (neutrons)			1 1
(b)	same electronic configuration(s) / structure(s) OR same <u>number</u> of electrons OR have <u>four/same number of</u> electrons in <u>outer / valence</u> shell IGNORE same number of electrons in inner shells IGNORE references to atomic number / same number of protons / different number of neutrons	amount for number / six electrons	different number of protons	1
(c) (i)	M1 the average / mean mass of an <u>atom</u> (of the element) M2 compared to / relative to (1/12 th) the mass (of an atom) of carbon-12 OR M1 mass of one mole of <u>atoms</u> M2 compared to (mass of) 1/12 th one mole / 1g of carbon-12	average/mean of: atomic masses / mass numbers / mass of isotopes on a scale where carbon-12 has a mass of 12 / compared with the mass of carbon-12 which is 12	mean mass of an element mass of one mole of the element	1 1

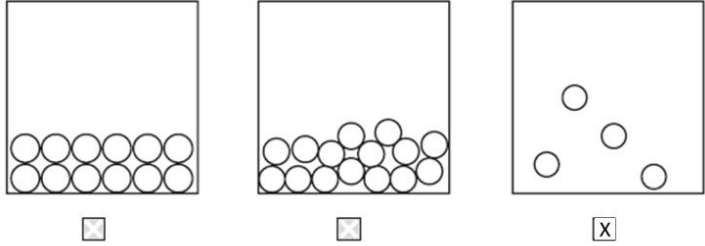
Question number	Expected Answer	Accept	Reject	Marks
1 c (ii)	M1 $(12 \times 98.9) + (13 \times 1.1)$ M2 ≈ 100 M3 12.01 IGNORE units	$(12 \times 0.989) + (13 \times 0.011)$ for first 2 marks 12.011 on its own for 2 marks 12.01 on its own for 3 marks		1 1 1

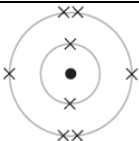
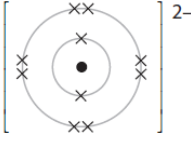
Question number	Answer	Notes	Marks
2 (a)	electron(s)		1
(b)	electron(s)		1
(c) (i)	protons (and) electrons	Accept in either order both answers	1
(ii)	protons		1
	neutrons		1
(d) (i)	12	Accept any other punctuation marks, such as , /) — and no punctuation marks	1
(ii)	24		1
(iii)	2.8.2		1

Total 8 marks

Question number	Answer	Notes	Marks
3 (a)	3		1
(b)	ammonia / NH ₃ hydrogen chloride / HCl	Do not accept ammonium Do not accept hydrochloric acid Accept in either order. If name and formula given, both must be correct. Ignore state symbols, except HCl (aq)	1 1
(c)	ammonium chloride / NH ₄ Cl	Do not accept ammonia chloride. If name and formula given, both must be correct.	1
(d)	cross in box 2 (decomposition) cross in box 4 (neutralisation)		1 1

Total 6 marks

Question number	Answer	Notes	Marks
4 a			1
b i	A (an electron)		1
	ii B (a neutron)		1
	iii B (electrons and protons)		1
c	isotopes		3
	atomic numbers		
	mass numbers		
Total 7 marks			

Question number	Answer	Accept	Reject	Marks
5 (a)	releases thermal energy	releases heat (energy) produces an increase in temperature	just releases energy	1
(b)	 D			1
(c)	 A			1
(d)	<p>M1 (consists of) positive <u>AND</u> negative/oppositely charged ions/Mg^{2+} <u>AND</u> O^{2-} (ions) IGNORE references to loss and gain of electrons</p> <p>M2 (strong) attraction between (positive <u>AND</u> negative/oppositely charged) ions/Mg^{2+} <u>AND</u> O^{2-} (ions)</p> <p>M3 many ions (present in lattice)/giant structure/giant lattice</p> <p>M4 large amount of energy required (to separate the ions/overcome the attraction between the ions)</p> <p>If mention of covalent bonds/metallic bonds/intermolecular forces only M4 can be awarded</p>	<p>(strong) ionic bonding/(strong) ionic bonds</p> <p>break the ionic bonding/bonds</p>		4
7 (e)	<p>M1 (name) magnesium chloride</p> <p>M2 (formula) $MgCl_2$</p> <p>Penalise inappropriate use of upper or lower case letters or numbers in the wrong place</p>	accept a correct formula as a <u>product</u> in an equation whether the equation correct or not		1 1
			Total	9

Question number		Answer		Notes	Marks	
6	a	M1	nucleus	Accept in either order	1	
		M2	protons		1	
		M3	neutrons		1	
		M4	electrons		1	
		M5	shells		1	
		M6	protons AND electrons		In either order	1
		M7	electrons		1	
b	i		3		1	
	ii		5		1	