Question number	Answer	Notes	Marks
1 (a)	gallium / Ga		1
(b)	sodium / magnesium / aluminium / Na / Mg / Al		1
(c)	fluorine / F / F ₂		1
(d)	nitrogen / N / N ₂		1
(e)	neon / argon / krypton / xenon / radon / Ne / Ar / Kr / Xe / Rn		1
		Total	5

Question number	Answer	Accept	Reject	Marks
2 (a) (i)	В			1
(ii)	A			1
(iii)	E			1
(iv)	С			1
(b) (i)	Atomic number			1
(ii)	Electrons in the outer shell			1
			Total	6

	Question number		Answer	Notes	Marks					
3	а	i	C (neutrons and protons)		1					
		ii	A (6)		1					
		iii	D (11)		1					
	b		4		1					
	С	i	P AND T		1					
		ii	S		1					
	d		(one) more electron than protons	Accept more electrons than protons	1					
								OR	Accept fewer protons than electrons	
				Accept 2 electrons and 1 proton						
			(one) fewer proton than electrons	Ignore references to electron gained						
				Total	7 marks					

-	estio mber		Answer	Notes	Marks
4	а		Number of protons6Number of neutrons6Number of electrons6	M1 protons and electrons correct M2 neutrons correct	2
	b	i	 3 M1 33 M2 Z is two places/columns/groups/positions after X OR Z is in Group 5 and X is in Group 3 	Accept has 2 more protons (than X) Ignore references to atomic number increasing by 2 Ignore number of protons increases with group number Ignore references to elements being arranged according to number of protons 31 + 5 - 3 = 33 scores 2 marks	1 2
		iii	2.8 / 2,8 / 2 and 8 separated by other mark eg : or / or) or space	Do not accept 28 (ie no space) Accept correct sp notation	1

Question number	Answer	Notes	Marks
4 b iv	M1 (similarity) one electron/same number of electrons in outer sh	 Accept rings and energy levels in place of shells in M1 and M2 Accept valence electrons in place of outer shell electrons Accept configuration ends in 1 Accept same outer shell Accept 2 electrons in first/inner shell 	2
	M2 (difference) different number of (electron) shells / T has (one) more (electron) shell / J has (one) less (electron) shell / J has 2 shells and T has 3 / J is 2.1 and T is 2.8.1	Accept going down the column there is 1 more shell Ignore T has an extra number Ignore T has 8 more electrons	
		Total	8 marks

	Question number		Answer	Notes	Marks
5	а	i	period	Ignore number of period	1
		ii	Any two of sodium / magnesium / aluminium	Ignore symbols Na, Mg, Al	1
		111	Ar / argon (it does) not easily gain/lose electrons OR has 8 electrons in outer shell	If name and symbol both given, then both must be correct Accept (it has) a full outer shell Ignore 2.8.8 Ignore inert/noble gas Ignore references to Group number Ignore stable M2 DEP on M1	2
	b		one electron/same number of electrons AND reference to outer/valence (shell/energy level/orbit)	Reject incorrect number of electrons Ignore similar electronic configurations Ignore actual electronic configurations	1
	С	i	C / carbon		1
		ii	S / sulfur		1
	d		8 for both protons AND electrons 10 neutrons	Accept words Accept words	1 1

(Total for Question 5 = 9 marks)

	Question number		Answer	Notes	
6	(a)		does not easily lose / gain electrons	Accept has a complete/full outer shell/octet (of electrons) Accept has 8 electrons in outer shell Ignore references to being stable / inert / a noble gas	1
	(b)		B (2.8.18.8)		1
	(c)	(i)	 M1 for idea of electron transfer / loss and gain of electron(s) M2 for direction of transfer M3 for number of electrons transferred 	 0/3 for electron sharing Ignore covalent eg calcium loses, chlorine gains electrons eg calcium loses 2, (each) chlorine gains 1 Penalise use of chloride in place of chlorine once only All marks may be scored from a correctly labelled diagram 	3
		(ii)	Ca ²⁺	Accept Ca ⁺² / Ca ⁺⁺ Reject all other ions Penalise incorrect use of lower and upper case letters and position of charge If equation written containing calcium ion formula, the ion must be identified in some way, such as circling or underlining	1
		(iii)	A calcium (and) calcium		1

	Question number		Answer	Notes	Marks
3	(d)		M1 (step 1) dip a platinum wire into some concentrated hydrochloric acid M2 (step 3) place the wire and sample into non- luminous Bunsen flame	 Accept complete statements or changes M1 Do not penalise references to dilute instead of concentrated Accept hydrochloric acid / HCI M2 Accept blue flame / roaring flame Ignore references to hot / hotter / hottest flame 	2
	(e)		B (lilac)		1
				Total for Question 6	10