

Question	Answer	Marks	AO Element	Notes	Guidance
1	D - Positive ions have more protons than electrons.	1			
2	B - P ₂ Q	1			
3	M1 (lattice of) positive ions / cations M2 (delocalised / sea of) electrons M3 attraction / attract between positive and negative	3			
4(a)	covalent	1			
4(b)	forces of attraction between molecules AND are weak / need a small amount of energy to break	1			
4(c)	no moving or flowing or mobile charged particles or ions or electrons	1			
5(a)	gas / gaseous	1			

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5(b)	M1 1 shared pair of electrons M2 6 non-bonding electrons on each atom to complete an octet	2			
5(c)	$2\text{Na} + \text{F}_2 \rightarrow 2\text{NaF}$ M1 NaF anywhere M2 equation fully correct	2			
5(d)	chlorine less reactive than fluorine ORA	1			
6	one shared pair between each H and C (1) three shared pairs of electrons between the C atoms and no other unpaired electrons (1)	2			
7	pair of bonding electrons between each N and H (1) two unpaired electrons on N AND no extra electrons on the H (1)	2			
8	all bonding pairs correct and no extra incorrect non-bonding electrons (1) 4 non-bonding electrons on O completing oxygen octet (1)	2			

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9	one bonding pair (1) six non-bonding electrons on each atom (1)	2			
10(a)	diffusion	1			
10(b)	silicon(IV) oxide is a solid, whereas carbon dioxide is a gas	1			
10(c)	photosynthesis (1) chlorophyll / chloroplasts (1) sunlight / UV (light) (1) $6\text{CO}_2 + 6\text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ (2) M1 species correct M2 balanced	5			
					[Total: 29]