Q	Part	Sub Part	Marking Guidance	Mark	Comments
2	(a)		Macromolecular	1	Or giant molecule Or giant covalent (also gains M2) Do not allow giant atomic Ionic/metallic CE=0 for all 3 marks
			Covalent bonding (between atoms)	1	Do NOT allow if between molecules
			Many/strong bonds to be broken (or lots of energy required)	1	Lose both bonding marks if contradiction e.g. mention of intermolecular forces Note: 'covalent bonds between molecules' loses M2 but **not** M3
2	(b)		Al_2O_3 ionic	1	Allow ionic + covalent/ ionic with covalent character
2	(c)		$2Al + 3/2O_2 \rightarrow Al_2O_3$	1	Allow multiples Ignore state symbols
2	(d)		Insoluble/impermeable/non-porous	1	Or does not react/inert Do not allow thick layer Must imply property of Al_2O_3 not Al
2	(e)		$Na_2O + H_2O \rightarrow 2NaOH$	1	Or $Na_2O + H_2O \rightarrow 2Na^+ + 2OH^-$
2	(f)	(i)	$Al_2O_3 + 6HCl \rightarrow 2AlCl_3 + 3H_2O$	1	Ionic equations with Al_2O_3 possible e.g. $Al_2O_3 + 6H^+ \rightarrow 2Al^{3+} + 3H_2O$ Do not allow formation of Al_2Cl_6

2	(f)	(ii)	$Al_2O_3 + 2NaOH + 3H_2O \rightarrow 2NaAl(OH)_4$	1	Other equations with Al_2O_3 are possible e.g. $Al_2O_3 + 2OH^- + 3H_2O \rightarrow 2[Al(OH)_4]^-$ $Al_2O_3 + 2OH^- + 7H_2O \rightarrow 2[Al(H_2O)_2(OH)_4]^-$
2	(g)		SiO_2 acidic/Lewis acid/electron pair acceptor $SiO_2 + 2NaOH \rightarrow Na_2SiO_3 + H_2O$	1 1	Allow SiO_2 **not** amphoteric Do NOT allow BL acid Other equations with SiO_2 are possible e.g. $SiO_2 + 2OH^- \rightarrow SiO_3^{2-} + H_2O$ $SiO_2 + 2OH^- + 2H_2O \rightarrow Si(OH)_6^{2-}$