

3. Chemical bonding

3.5 Shapes of molecules

Paper 3

Marking Scheme

Q1.

(e)	M1 6 bonding pairs (of electrons and 0 lone pairs) OR coordination number = 6 OR $x = 6$ M2 bonding pairs repel (equally)	2
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Q2.

(d)(v)	M1 $90^\circ < Cl-S-S \leq 108^\circ$	1
	M2 sulfur has two lone pairs (of e^-) (and two bonding pairs) AND repulsion from lone pairs (greater)	1

Q3.

(c)		name of shape	bond angle / °	3
	CO ₂	Linear	180	
	NH ₃	Pyramid(al)	107	
	H ₂ O	non-linear / V / bent	104.5	
All 6 correct – 3 marks 4 or 5 correct – 2 marks 2 or 3 correct – 1 mark				

Q4.

(d)	M1 shape $\begin{array}{c} Cl & & Cl \\ & \diagdown & / \\ & Ga & \\ & / & \diagdown \\ Cl & & Cl \end{array}$ M2 bond angle 120(°)	2
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Q5.

(a)(ii)	120	1
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Q6.

(d)(i)	M1 : (trigonal) pyramidal	2
	M2 : 107	

Q7.

(b)	$a = 109(.5)^\circ$	1
	$b = 120^\circ$	1

Q8.

(c)(i)	octahedral	1
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