

Question number	Answer	Marks	Guidance
1 (a) (i)	CDCl ₃ or CD ₂ Cl ₂ or C ₆ D ₆ or CCl ₄	1	Not D ₂ O Allow CD ₃ Cl
1 (a) (ii)	4	1	
1 (a) (iii)	Triplet	1	
1 (a) (iv)	1,4-dichloro-2,2-dimethylbutane	1	Do not penalise different or missing punctuation or extra spaces. Spelling must be exact and order of letters and numbers as here.
1 (b) (i)	3	1	
1 (b) (ii)	190–220 cm ⁻¹	1	Allow a single number within the range. OR a smaller range entirely within this range
1 (b) (iii)	hexane-2,5-dione	1	Do not penalise different or missing punctuation or extra spaces. Spelling must be exact and order of letters and numbers as here. NB so must have middle e
2 (a)	J (acid) amide K (secondary) amine or amino	1 1	not peptide, not N-substituted amide penalise primary or tertiary allow N-substituted amine
2 (b)	(δ =) 3.1–3.9 doublet OR duplet	1 1	Not 3.7–4.1 Not secondary name required not the number 2
2 (c) (i)	Solvent must be proton-free OR CHCl ₃ has protons or has H or gives a peak	1	
2 (c) (ii)	CDCl ₃ is polar OR CCl ₄ is non-polar	1	
2 (d)	11 OR eleven	1	
2 (e) (i)	Si(CH ₃) ₄ OR SiC ₄ H ₁₂	1	ignore TMS
2 (e) (ii)	a single number or a range within 21-25	1	penalise anything outside this range
2 (e) (iii)		1	allow ring around the C only and also allow

2 (f) (i)	NaBH ₄	1	ignore name if formula correct ignore solvent allow LiAlH ₄ Zn/HCl Sn/HCl H ₂ /Ni H ₂ /Pt
2 (f) (ii)		1	allow ring around the C only
2 (f) (iii)	(plane) polarised light OR light in a polarimeter polarised light is not rotated or is unaffected	1 1	penalise bent / diffracted / deflected / reflected Not just solution is optically inactive
2 (f) (iv)	advantages cheaper medicine due to cost or difficulty of separation or both can lower blood pressure OR more effective/beneficial with a reason Disadvantages may be side effects from one enantiomer in the mixture OR only half the product works or one enantiomer may be ineffective OR double dose required	1 1	or no need to separate