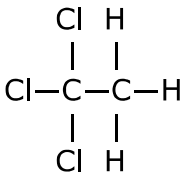
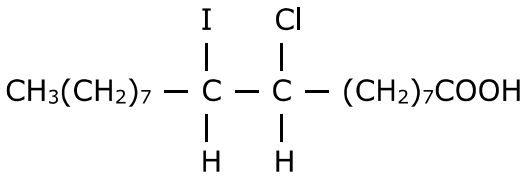
Section C

Question Number	Correct Answer	Reject	Mark
16(a)(i)		Skeletal / structural formulae	**(1)**

Question Number	Correct Answer	Reject	Mark
16(a)(ii)	**Read the whole answer first** **Any two from** • (Higher boiling temperature) because it has stronger/more London forces • (Because it has) more electrons (66 compared with 50) **IGNORE** References to larger electron cloud / higher electron density / greater M_r / incorrect 'counting' of electrons in either or both molecules • 1,1,1-trichloroethane has dipole-dipole interactions • (Because the molecule is polar due to) polar C-Cl bonds OR • Cl is more electronegative than C OR Cl is more electronegative than H OR Cl atoms on same side (of molecule) OR C-Cl dipoles do not cancel • Hexane has **only** London forces	Any reference to breaking covalent bonds scores **(0)** overall	**(2)**

Question Number	Correct Answer	Reject	Mark
16(a)(iii)	Because they damage the ozone layer OR (Halothane products like) 1,1,1-trichloroethane are narcotic inhalants / poisonous / toxic **IGNORE** References to just: • formation of chlorine radicals • formation of Cl• • carcinogen	Any statement that this compound is a CFC / forms Cl_2 (on breaking down)	**(1)**

Question Number	Correct Answer	Reject	Mark
16(b)(i)	ICl is a **stronger** electrophile / **better** electrophile Allow a correct description of an electrophile even if the term is not used. e.g. ICl has a vacancy for a bonding pair of electrons OR the ICl (bond) is polar **NOTE:** ALLOW the ICl (bond) is more polar OR Mention of presence of the $I^{\delta+}$ (in ICl) ALLOW 'It' for ICl	Any references to Cl attacking the C=C	**(1)**

Question Number	Correct Answer	Reject	Mark
16(b)(ii)	 I and Cl can be interchanged and on either side Look out for only I or Cl added without hydrogen, also 2I and 2Cl added.	I and Cl on the same carbon	**(1)**

Question Number	Correct Answer	Reject	Mark
16(b)(iii)	To prevent formation of free radicals OR To prevent (free radical) substitution OR To prevent (I-Cl) bonds breaking homolytically **ALLOW** **UV** causes it to react / to decompose **IGNORE** light causes it to react / to decompose	Causes oxidation **C-Cl** breaks	**(1)**

Question Number	Correct Answer	Reject	Mark
16(b)(iv)	ALL THREE oxidation numbers must be correct: (Iodine monochloride) +1 ALLOW 1+ (Iodide ion) -1 ALLOW 1- (Iodine) 0 **(1)** (Ionic equation) $ICl + I^- \rightarrow I_2 + Cl^-$ Ignore state symbols even if incorrect Both partial and full charges on ICl are acceptable, provided they are the right way around **(1)**		**(2)**

Question Number	Correct Answer	Reject	Mark
16(c)	(Indicator) Starch (solution) **(1)** (Colour change from) Blue-black to colourless **ALLOW** Blue to colourless OR Black to colourless **IGNORE** References to 'clear' **(1)** **Mark independently**	No M2 if states "From **purple** to …"	**(2)**

In 16(d) penalise incorrect units once **only**

Question Number	Correct Answer	Reject	Mark
16(d)(i)	Number of moles of thiosulfate = $\frac{20.0 \times 0.100}{1000}$ = 2(.00) x 10^{-3} / 0.002(00)		**(1)**

Question Number	Correct Answer	Reject	Mark
16(d)(ii)	$(2S_2O_3^{2-}(aq) + I_2(aq) \rightarrow) \quad S_4O_6^{2-} + 2I^-$ IGNORE state symbols even if incorrect		**(1)**

ALLOW TE in all remaining parts from the previous part(s) **Calculators needed!**

PENALISE rounding errors in (d)(v) to (d)(vii) **only once**
Also penalise 1 SF in (d)(v) to (d)(vii) **only once**

Question Number	Correct Answer	Reject	Mark
16(d)(iii)	Number of moles of iodine = 0.002(00)÷2 = 1(.00) x 10^{-3} / 0.001(00) (mol)		**(1)**

Question Number	Correct Answer	Reject	Mark
16(d)(iv)	1(.00) x 10^{-3} / 0.001(00) (mol)		**(1)**

Question Number	Correct Answer	Reject	Mark
16(d)(v)	(0.001(00) - 0.000365) = 6.35 x 10^{-4} / 0.000635 (mol)		**(1)**

Question Number	Correct Answer	Reject	Mark
16(d)(vi)	$\frac{0.000635 \times 100}{0.2(00)}$ **OR** 0.000635 x 500) = 0.3175 (mol)		**(1)**

Question Number	Correct Answer	Reject	Mark
16(d)(vii)	0.3175 x 2 x 126.9 = 80.5815 (g) If student uses A_r for I = 127, final answer equals 80.645 (g)		**(1)**

If d(iii)/(iv) is 0.002 this gives 0.001635, 0.8175 and 207.4815 for (v) to (vii)

If d(iii)/(iv) is 0.0005 this gives 0.000135, 0.0675 and 17.1315 for (v) to (vii)

Question Number	Correct Answer	Reject	Mark
16(e)	(Sample titre) Higher **and** (Iodine value) Lower		**1**

(Total for Section C = 19 Marks)

TOTAL FOR PAPER = 80 MARKS