

M1. (a) (i)

	The addition of AgNO ₃	followed by concentrated	the addition of NH ₃ (aq)
Observation with NaBr(aq)	Cream or off white precipitate or solid (1)		Precipitate dissolves (1)
Observation with NaI(aq)	Yellow precipitate or solid (1)		Precipitate insoluble or no change (1)

(ii) Ag F is soluble;

5

(b) (i) identity: [Ag(S₂O₃)₂]³⁻;

1

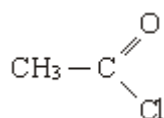
(ii) equation: AgI + 2S₂O₃²⁻ → [Ag(S₂O₃)₂]³⁻ + I⁻

1

(iii) use: in photography or as a fixer;

1

(c) (i) Structure

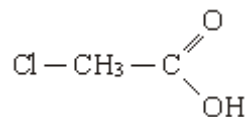


Observation: Vigorous or violent or exothermic reaction or fumes or white precipitate formed immediately

1

1

(ii) Structure:



Observation: No immediate precipitate or reaction

1

OR

white precipitate formed very slowly;

1

- (d) (i) Silver-containing complex: $[\text{Ag}(\text{NH}_3)_2]^+$ 1
- Shape: Linear; 1
- (ii) Structure
- $$\begin{array}{c} \text{O} \\ \parallel \\ \text{H}-\text{C} \\ \backslash \\ \text{OH} \end{array}$$
- 1
- Explanation: Methanoic acid contains an aldehyde group; 1
- (iii) H_2CO_3 or CO_2 or $\text{OC}(\text{OH})\text{NH}_2$ or $(\text{NH}_2)_2\text{CO}$ or $(\text{NH}_4)_2\text{CO}_3$
- OR
- HCOONH_4 ; 1

[17]

M2.D

[1]

- M3.** (a) Gains electrons (or removes electrons) 1
- (b) (i) +4 1
- +6 1
- (ii) $\text{Br}_2 + 2\text{e}^- \rightarrow 2\text{Br}^-$ 1
- (iii) $\text{SO}_2 + 2\text{H}_2\text{O} \rightarrow 4\text{H}^+ + \text{SO}_4^{2-} + 2\text{e}^-$

- 1
- (iv) $\text{Br}_2 + \text{SO}_2 + 2\text{H}_2\text{O} \rightarrow 2\text{Br}^- + 4\text{H}^+ + \text{SO}_4^{2-}$ 1
- (c) $\text{Cl}_2 + \text{H}_2\text{O} \rightarrow \text{H}^+ + \text{Cl}^- + \text{HOCl}$ 1
- Chloride: -1 1
- Chlorate(I): $+1$ 1
- (d) Chloride ions cannot reduce sulphuric acid
*(Or chloride ions are weak reducing agents
 Or sulphuric acid is not a strong enough oxidising agent
 Or sulphuric acid is a weaker oxidising agent than chlorine)* 1
- (e) $\text{KCl} + \text{H}_2\text{SO}_4 \rightarrow \text{HCl} + \text{KHSO}_4$
(Allow $2\text{KCl} + \text{H}_2\text{SO}_4 \rightarrow 2\text{HCl} + \text{K}_2\text{SO}_4$) 1
- (f) (i) Bromine 1
- (ii) Sulphur dioxide 1

[13]