

Name of the Student: _____

Max. Marks : 27 Marks

Time : 27 Minutes

Mark Schemes

Q1.

- (a) (ligand) substitution

Allow 'ligand exchange'.

1

- (b) To displace
- the equilibrium
- to the right

To ensure reaction goes to completion.

1

To improve the yield

Allow 'to replace all chlorines'.

1

- (c) (i)
- $\text{K}_2\text{PtCl}_4 + 4\text{KI} \rightarrow \text{K}_2\text{PtI}_4 + 4\text{KCl}$

Allow correct ionic equations $\text{PtCl}_4^{2-} + 4\text{I}^- \rightarrow \text{PtI}_4^{2-} + 4\text{Cl}^-$ *Allow multiples and fractions.*

1

- (ii)
- $= (780.9) \times 100 / (415.3 + 664)$

*Working must be clearly shown.**Allow one mark for correct relationship even if M_r values are incorrect eg using values from ionic equation.*

1

 $= 72.4$ *Allow 72%*

1

- (d) (i)
- $\text{Ag}^+ + \text{I}^- \rightarrow \text{AgI}$

*Ignore state symbols even if incorrect.**This equation only.*

1

- (ii) Stops the reverse reaction / equilibrium displaced to the right

1

- (e) Number of steps in the process

Allow 'equilibrium may lie on the reactant side' / side reactions / isomer formation.

1

Losses at each stage of the synthesis

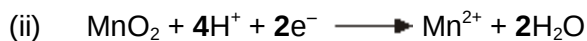
Equilibrium losses or practical losses or yield not 100% for each step.

1

(f)	Minimum amount of hot solvent <i>Accept 'small' for minimum.</i> <i>Accept water.</i>	1
	Cool / crystallise	1
	Filter	1
(g)	(i) Small amounts are more likely to kill cancer cells rather than the patient	1
	(ii) Wear gloves / wash hands after use <i>Ignore masks.</i> <i>Apply the list principle if more than one answer.</i>	1
		[15]

Q2.

(a) (i) $\text{MnO}_2 (+) 4$ 1



Or multiples

Ignore state symbols

Credit electrons subtracted from RHS

Ignore absence of charge on e 1

(iii) Iodide ion(s) is/are oxidised because they have lost electron(s)
Do not penalise reference to iodine; the mark is for electron loss 1

(b) (i) **M1** Cl_2 0

M2 $\text{HClO} (+) 1$ 2

(ii) **M1** Equilibrium will shift/move to the right

OR L to R

OR to favour the forward reaction

OR to produce more HClO

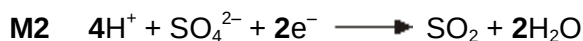
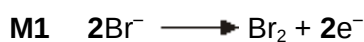
M2 Consequential on correct M1

To oppose the loss of HClO

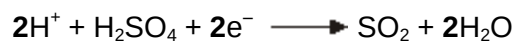
OR replaces the HClO (that has reacted)
for M2

NOT just "to oppose the change" 2

(c) (i) The answers can be in either order



OR

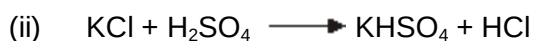


NOT multiples

Ignore state symbols

Credit electrons subtracted from incorrect side

Ignore absence of charge on e 2



OR



Credit ionic equations

1

- (iii) For M1 and M2, chloride ions are weaker reducing agents than bromide ions, because

M1 Relative size of ions

Chloride ions are smaller than bromide ions OR
chloride ion electron(s) are closer to the nucleus
OR chloride ion has fewer (electron) shells/levels
OR chloride ion has less shielding (or converse for
bromide ion)

M2 Strength of attraction for electron being lost

Outer shell/level electron(s) OR electron(s) lost
from a chloride ion is more strongly held by the
nucleus compared with that lost from a bromide
ion (or converse for bromide ion)

*If the forces are described as intermolecular or Van der Waals then CE
= 0*

Ignore general reference to Group 7 trend

*For M1 accept reference to chlorine/bromine or reference to atoms of
these but NOT "chloride/bromide atoms" or "chlorine/bromine
molecules"*

For M2 insist on reference to the correct ions

*This is the expected answer, but award credit for a candidate who
gives a correct explanation in terms of hydration enthalpy, electron
affinity and atomisation enthalpy.*

2

[12]