

Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Mark Schemes

Q1.

(a) NaBr ONLY

Penalise incorrect case or additional formulae.

Ignore names

1

(b) NaF ONLY

Penalise incorrect case or additional formulae.

Ignore names

1

(c) ONLY one from either
NaF

OR

NaCl

Penalise incorrect case or additional formulae.

Ignore names

1

(d) NaI ONLY

Penalise incorrect case or additional formulae.

Ignore names

1

[4]

Q2.

- (a) **M1** Cl_2 (provides the pale green colour)

M1 requires the formula

M2 NaOH reacts with the acid(s)/the HCl/the HClO/H^+

Ignore "reacts with the products"

Ignore "reacts with chloride ion"

Ignore "reacts with chlorine"

M3 requires a correct answer in M2

Equilibrium shifts (from left) to right **OR** wtte

3

- (b) **M1** A reducing agent is an electron donor OR (readily) loses/ gives away electrons

Penalise M1 if "electron pair donor"

M2 $\text{Cl}_2 + 2\text{e}^- \rightarrow 2\text{Cl}^-$

For M3 and M4, iodide ions are stronger reducing agents than chloride ions, because

Ignore state symbols in M2 Accept no charge on the electron

Credit the electrons being lost on the RHS

M3 Relative size of ions/atomic radius/ionic radius

Iodide ions are larger/have more (electron) shells/levels than chloride ions (or converse for chloride ion) OR electron(s) to be lost/outer shell/level is further from the nucleus (or converse for chloride ion) OR greater/more shielding

For M3 insist on "iodide ions"

M4 Strength of attraction for electron(s) being lost

Electron(s) lost from an iodide ion is less strongly held by the nucleus compared with that lost from a chloride ion

M3 and M4 must be comparative and should refer to electrons.

(assume argument refers to iodide ions but accept converse argument for chloride ions)

4

- (c) **M1** $2\text{Cl}_2 + 2\text{H}_2\text{O} \rightarrow 4\text{HCl} + \text{O}_2$

Or multiples

M2 silver chloride ONLY

M2 requires a name

M3 The solid/precipitate would dissolve

OR is soluble

OR (It) forms a (colourless) solution

Mark M3 independently

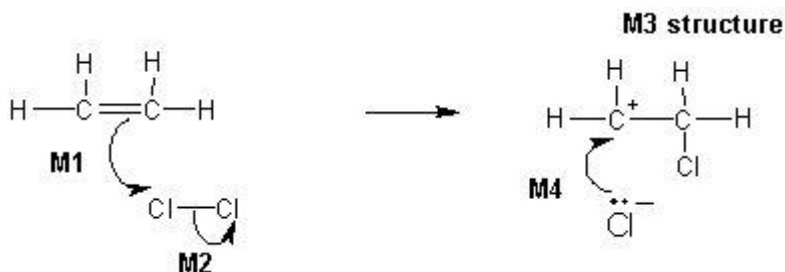
Ignore "disappears"

3

- (d) Electrophilic addition

1

Mechanism:



M2 Penalise partial charges if wrong way around, otherwise ignore
Max 3 marks **for the mechanism** for wrong reactant and/or “sticks”
(wrong reactant could be HBr or Br₂ or incorrect alkene)

M1 must show an arrow from the double bond towards one of the Cl atoms on a Cl–Cl molecule.

M2 must show the breaking of the Cl–Cl bond.

M3 is for the structure of the carbocation with Cl substituent.

M4 must show an arrow from the lone pair of electrons on a negatively charged chloride ion towards the positively charged carbon atom.