

Name of the Student: _____

Max. Marks : 25 Marks

Time : 25 Minutes

Mark Schemes

Q1.

(a) (i) **M1 0****M2 (+) 5***Accept Roman V for M2*

2

*Accept multiples*

1

*For M1, ignore state symbols**Credit multiples**Accept $2\frac{1}{2}I_2 + \frac{1}{2}I_2$ as alternative to $3I_2$* *Electrons must be cancelled***M2** $NaIO_3$ **OR** IO_3^- **OR** iodate ions **OR** iodate(V) ions etc.*For M2 Do not penalise an incorrect name for the correct oxidising agent that is written in addition to the formula.**Accept "the iodine in iodate ions" but NOT "iodine" alone**Accept "the iodine / I in iodate ions" but NOT "iodine" alone*

2

(c) (i) Iodine **OR** I_2 *Insist on correct name or formula*

1

*Ignore state symbols**Credit multiples**Do not penalise absence of charge on the electron*

1

(d) hydrogen sulfide

OR H_2S **OR** hydrogen sulphide

1

- (e) (i) $\text{Ag}^+ + \text{I}^- \rightarrow \text{AgI}$ ONLY
 Ignore state symbols
 No multiples
 1
- (ii) The (yellow) precipitate / solid / it does not dissolve / is insoluble
 ignore "nothing (happens)"
OR turns to a white solid
 ignore "no observation"
OR stays the same
OR no (visible/ observable) change
OR no effect / no reaction
 1
- (iii) The silver nitrate is acidified to
- react with / remove (an)ions that would interfere with the test
 Ignore reference to "false positive"
 - prevent the formation of other silver precipitates / insoluble silver compounds that would interfere with the test
 Do not penalise an incorrect formula for an ion that is written in addition to the name.
 - remove (other) ions that react with the silver nitrate
 - react with / remove carbonate / hydroxide / sulfite (ions)
 If only the formula of the ion is given, it must be correct
- 1
- (f) (i) An electron donor
 Penalise "electron pair donor"
OR (readily) donates / loses / releases / gives (away) electron(s)
 Penalise "loss of electrons" alone
 Accept "electron donator"
 1
- (ii) $\text{Cl}_2 + 2\text{e}^- \longrightarrow 2\text{Cl}^-$
 Ignore state symbols
 Do not penalise absence of charge on electron
 Credit $\text{Cl}_2 \longrightarrow 2\text{Cl}^- - 2\text{e}^-$
 Credit multiples
 1
- (iii) For M1 and M2, iodide ions are stronger reducing agents than chloride ions, because
 Ignore general statements about Group VII trends or about halogen molecules or atoms. Answers must be specific
- M1 Relative size of ions**
 CE=0 for the clip if "iodine ions / chlorine ions" **QoL**

Iodide ions / they are larger / have more electron levels (shells)
(than chloride ions) / larger atomic / ionic radius

CE=0 for the clip if "iodide ions are bigger molecules / atoms" QoL

OR electron to be lost/outer shell/level (of the iodide ion) is further the nucleus

OR iodide ion(s) / they have greater / more shielding

Insist on iodide ions in M1 and M2 or the use of it / they / them, in the correct context (or chloride ions in the converse argument)

OR converse for chloride ion

M2 Strength of attraction for electron(s)

Must be comparative in both M1 and M2

The electron(s) lost /outer shell/level electron from (an) iodide ion(s) less strongly held by the nucleus compared with that lost from a chloride ion

OR converse for a chloride ion

2

[15]

Q2.

- (a) Iodine has more electrons / iodine is bigger (atom or molecule) / iodine has bigger M_r / bigger surface area

1

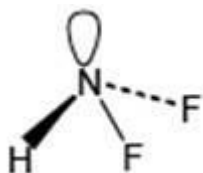
Stronger / more van der Waals forces / vdw / London / temporarily induced dipole / dispersion forces between molecules

1

Stronger VdW intermolecular forces = M2

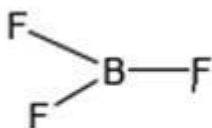
If stated VdW between atoms lose M2

- (b) (i)



Mark is for 3 bp and 1 lp attached to N (irrespective of shape)

1



Mark is for 3 bp and 0 lp attached to B (irrespective of shape)

1

NHF₂ shape - pyramidal / trigonal pyramid
Accept tetrahedral / triangular pyramid

1

BF₃ shape - trigonal planar
Not triangular or triangular planar

1

- (ii) 107°

Allow 106-108°

1

- (c) Hydrogen bonds

Allow H-Bonds

Not just Hydrogen

Apply list principle eg Hydrogen bonding and dipole-dipole = 0

1

- (d) Coordinate / dative covalent / dative

If covalent mark on

If ionic / metallic CE = 0

1

Lone pair / both electrons/ 2 electrons on N(HF₂) donated (to BF₃)

