Practice Question Set For A-Level
Subject : Chemistry
Paper-1 Topic: Inorganic 1

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Name of the Student:_____
Max. Marks : 13 Marks **Time : 13 Minutes**

Mark Schemes

Q1.

(a) (i) **M1 Initiation**

$Cl_2 \longrightarrow 2Cl\bullet$

M2 First propagation

$Cl\bullet + CH_3CH_3 \longrightarrow \bullet CH_2CH_3 + HCl$
C_2H_6

M3 Second propagation

$Cl_2 + \bullet CH_2CH_3 \longrightarrow CH_3CH_2Cl + Cl\bullet$
C_2H_5Cl

M4 Termination (must make C_4H_{10})

$2\ \bullet CH_2CH_3 \longrightarrow C_4H_{10}$ or $CH_3CH_2CH_2CH_3$

Penalise absence of dot once only.
Penalise + or – charges <u>every time</u>
Penalise incorrect position of dot on ethyl radical once only.
Penalise $C_2H_5\bullet$ once only
Accept $CH_3CH_2\bullet$ with the radical dot above/below/to the side of <u>the CH_2</u>
Mark independently

4

(ii) **M1** ultra-violet/uv/sun light
OR (very) high temperature OR 500 °C ≥ T ≤1000 °C

M2 (free-)<u>radical substitution</u>
Ignore "heat" for M1
Both words needed for M2
For M2, ignore the word "mechanism"

2

(b) (i) $Cl_2 + H_2O \longrightarrow HClO + HCl$

OR

$Cl_2 + H_2O \longrightarrow 2H^+ + ClO^- + Cl^-$
Accept HOCl or ClOH
Accept other ionic or mixed representations
Ignore state symbols

1

(ii) **M1** Any one from

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- in swimming pools
- in drinking water
- to sterilise/disinfect/sanitise water
- in water treatment

Ignore the manufacture of bleach
Ignore "to clean water"
Ignore "water purification"

M2 The (health) benefit outweighs the risk or wtte
OR a clear statement that once it has done its job, little of it remains OR used in (very) dilute concentrations/ small amounts/low doses

Mark independently but M1 can score from (M2) explanation

2

(iii) Sodium chlorate(I) or sodium hypochlorite

Must be named

Ignore (in)correct formulae

Insist on the (I) in the name

1

(c) (i) $Cl_2 + \mathbf{2}Br^- \longrightarrow Br_2 + \mathbf{2}Cl^-$

Or half this equation

Ignore state symbols

1

(ii) **M1 The relative size (of the molecules/atoms)**
Bromine is larger than chlorine OR has more electrons/electron shells
OR It is larger/It has a larger atomic radius/it is a larger molecule/atom

M2 How size of the intermolecular force affects energy needed
The forces between bromine/Br_2 molecules are stronger (than the forces between chlorine/Cl_2 molecules leading to more energy needed to separate the molecules) (or converse)
OR bromine/Br_2 has stronger/more (VdW) intermolecular forces.
(or converse)

For M1 ignore whether it refers to molecules or atoms.

CE = 0 for reference to (halide) ions

Ignore molecular mass

QoL *for clear reference to the difference in size of the force between molecules*

Penalise M2 if covalent bonds are broken

2

[13]

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