FORM IV CHEMISTRY SUMMER REVISION

STATES OF MATTER

- Interconversion between the 3 states of matter
- Application of kinetic theory to changes of state
- Diffusion
- Physical and chemical changes
- Mixtures and compounds
- Separation techniques – filtration, crystallization, distillation, fractional distillation chromatography, sublimation, separating funnel
- Heating and cooling curves

Revision examples from Chemistry SEC past papers

May 2010 Paper 1 No 3

May 2011 Paper 1 No 1

May 2012 Paper 2A No 1 and 12

May 2013 Paper 2A No 1

May 2014 Paper 1 No 11a and b
Paper 2A No 1 and 3

May 2015 Paper 1 No 1 and 12
Paper 2A No 1

May 2016 Paper 2A No 1

THE ATOM

- Structure of atom – protons, neutrons and electrons
- Atomic number
- Mass Number
- Electronic configuration
- Ions
- Isotopes
- Allotropy

- Symbols of elements/radicals
- Valencies of elements/radicals
- Balancing equations
- State symbols
- Bonding (ionic, covalent, giant molecular and metallic)
- Characteristics of the different types of bonding, explained in terms of the bonding model

Revision examples from Chemistry SEC past papers

May 2010 ***Paper 1 No 1and 5***
Paper 2A No1 and 6

May 2011 ***Paper 1 No 6 and 10***
Paper 2A No 1, 4a and 6

May 2012 ***Paper 1 No 9***
Paper 2A No 3

May 2013 ***Paper 1 No 2, 4***

May 2014 ***Paper 1 No 6***

May 2015 ***Paper 1 No 2***

May 2016 ***Paper 1 No 2 and 9***

AIR

- Composition – nitrogen, oxygen, water vapour, carbon dioxide and noble gases
- Experimental determination of the percentage composition by volume of nitrogen and oxygen in air
- Combustion – Reaction of Magnesium, copper, Carbon and Sulfur with oxygen in air.
- Products of combustion of hydrocarbons
- Test for the presence of water and carbon dioxide
- Rusting
- Air pollution
- Greenhouse effect
- Ozone layer

OXYGEN

- Properties of oxygen
- Test for oxygen
- Preparation of oxygen (and dry oxygen) in the lab
- Preparation of oxygen in industry
- Types of oxides – basic, acidic, amphoteric and neutral

Revision examples from Chemistry SEC past papers

May 2010 ***Paper 1 No 10***

May 2011 ***Paper 1 No 9***
Paper 2A No 10

May 2013 ***Paper 1 No 6***
Paper 2A No 2 and 14

May 2014 ***Paper 2A No 2***

May 2015 ***Paper 2A No 2, 9 and 11***

May 2016 ***Paper 1 No 5***
Paper 2A No 3

HYDROGEN

- Properties of hydrogen
- Uses of hydrogen
- Preparation of hydrogen in the lab
- Reactivity series

Revision examples from Chemistry SEC past papers

May 2010 ***Paper 1 No 6***

May 2011 ***Paper 2A No 8***

May 2013 ***Paper 1 No 10***

ACIDS AND BASES

- What is an acid?
- What is a base/alkali?
- Strong/weak acids
- Strong/weak bases
- Basicity of an acid
- Properties of acids
- Properties of bases
- pH scale
- Indicators
- Normal salts/acid salts
- Preparation of salts
- Solutions of HCl in water/methylbenzene
- Preparation of a standard solution
- Acid/alkali titrations and related calculations

Revision examples from Chemistry SEC past papers

May 2010	***Paper 1 No 9and 12***
May 2011	***Paper 1 No 2***
	Paper 2A No 5
May 2012	***Paper 1 No 4***
	Paper 2A No 12
May 2013	***Paper 1 No 7, 8***
May 2014	***Paper 1 No 4 and 5***
May 2016	***Paper 1 No 4***

CHEMICAL CALCULATIONS

- Determination of empirical and molecular formulae
- Relative molecular masses
- Mass/mole conversion
- Volume/mole conversion
- Moles in solution/Titrations
- Avogadro's law

Revision examples from Chemistry SEC past papers

May 2010 ***Paper 1 No 2a and 8***
Paper 2A No 3 and 4

May 2011 ***Paper 1 No 3 and 8***
Paper 2A No 14a,b

May 2012 ***Paper 1 No 6,7 and 11***
Paper 2A No 5, 6 and 8a

May 2014 ***Paper 1 No 10***
Paper 2A No 8 and 9

May 2015 ***Paper 1 No 4 and 5***
Paper 2A No 7

May 2016 ***Paper 1 No 10 and 11a, b***
Paper 2A No 10

ALKALI AND ALKALINE EARTH METALS

- Characteristics of the metals and similarities in the group
- Physical properties
- Chemical reactions with oxygen, water, chlorine (for group 1 metals) and dilute acids (for group 2 metals)
- Trend of reactivity going down the group
- Conversion of limestone ($CaCO_3$) to quicklime (CaO) and subsequently to slaked lime ($Ca(OH)_2$)
- Importance of Calcium carbonate as a raw material.

TRANSITION ELEMENTS (Iron and Copper)

Properties of transition elements
Iron – Action of steam, hydrogen chloride and chlorine on iron
Iron (ii) and Iron (iii) hydroxides – formation by precipitation
Colour Oxidation of iron(ii) to iron(iii) by exposure to air

Copper

Copper oxide – typical basic oxide
Colour
Use of copper oxide to prepare copper (II) salts by reacting it with dilute acids
Reduction of copper oxide by hydrogen
Thermal decomposition of copper carbonate and copper (II) nitrate
Reduction of copper(II) ions to copper(I) ions

HALOGENS

- Trends in group 7
- Preparation of chlorine in the laboratory
- Preparation of chlorine in industry
- Chlorine as a bleaching agent
- Chlorine as an oxidizing agent
- Test for chlorine
- Displacement reactions of the halogens
- Properties of Hydrogen chloride
- Preparation of hydrogen chloride and hydrochloric acid in the laboratory
- Test for hydrogen chloride
- Solubility and properties of hydrogen chloride in water and methyl benzene.

Revision examples from Chemistry SEC past papers

May 2010 ***Paper 1 No 11***
Paper 2A No 11 and 14

May 2011 ***Paper 1 No 5 and 8***
Paper 2A No 9

May 2012 ***Paper 2A No 9 and 11***

May 2013 ***Paper 1 No 11***
Paper 2A No 5

May 2014 ***Paper 1 No 12***
Paper 2A No 4 and 12

May 2015 ***Paper 2A No 3***

May 2016 ***Paper 2A No 8 and 13***

QUALITATIVE ANALYSIS

Identification of cation – flame test
Adding sodium hydroxide solution
Adding ammonia solution

Identification of anion – Test for halides (Cl-, Br-, and I-)
Test for a carbonate
Test for a nitrate
Test for a sulfate/sulfite

Revision examples from Chemistry SEC past papers

May 2010 Paper 1 No 11

May 2011 Paper 1 No 7

May 2012 Paper 1 No 12

May 2013 Paper 1 No 12

May 2014 Paper 2A No 5 and 14

May 2015 Paper 2A No 13

May 2016 Paper 1 No 12
Paper 2A No 4

EFFECT OF HEAT ON COMPOUNDS

- Heating carbonates and hydrogencarbonates
- Heating nitrates
- Heating zinc oxide
- Heating sucrose
- Heating hydrated copper (II) sulfate
- Effect of heat on certain elements – copper, magnesium, carbon and sulphur

Revision examples from Chemistry SEC past papers

May 2010 Paper 2A No 8

May 2012 Paper 1 No 2
Paper 2A No 14 a,b and c

May 2013 Paper 2A No 11

May 2015 ***Paper 1 No 3***

May 2016 ***Paper 2A No 11***

OXIDATION/REDUCTION AND IONIC EQUATIONS

- Reactions in terms of loss/gain of oxygen, hydrogen and electrons.
- Oxidation number
- Redox reactions
- Oxidizing/Reducing agents
- Ionic equations

Revision examples from Chemistry SEC past papers

May 2010 ***Paper 2A No 9***

May 2011 ***Paper 2A No 2***

May 2012 ***Paper 1 No 5***

May 2013 ***Paper 2A No 7***

May 2015 ***Paper 2A No 12***

ELECTROLYSIS

- Effect of electricity on solids, molten substances and aqueous solutions
- Conductors/Non-conductors
- Electrolytes/Non-electrolytes
- Factors affecting product formation at the electrodes
- Electrolysis of dilute sulfuric acid, dilute hydrochloric acid, concentrated aqueous sodium chloride and copper(II) sulfate using inert electrodes and electrolysis of copper(II) sulfate using copper electrodes
- Importance of electrolysis in industry
- The simple cell
- Calculations regarding electrolysis

Revision examples from Chemistry SEC past papers

May 2010 ***Paper 1 No 4***

May 2011 ***Paper 2A No 13***

May 2012	***Paper 1 No 3*** ***Paper 2A No 7***
May 2013	***Paper 2A No 12***
May 2014	***Paper 2A No 11***
May 2015	***Paper 1 No 11***
May 2016	***Paper 1 No 6*** ***Paper 2A No 12***

Some useful websites include:

- www.bbc.co.uk/schools/gcsebitesize/chemistry
- www.gcsescience.com/q.htm
- www.s-cool.co.uk/gcse/chemistry
- www.docbrown.info/page05/page05.htm#8