Paper 1 Content

C1 Atomic Structure	Analysis	Revision
Can identify elements using the symbol on the periodic table, e.g., O represents an oxygen atom.		
Can state how compounds are formed and how chemical reactions are identified.		
Can identify compounds and elements from chemical formula.		
Can use the periodic table to use the names and symbols of the first 20 elements in the periodic table, particularly groups 1 and 7.		
Can name compounds when given word or symbol equations.		
Can write word equations.		
Can write formulae and balanced symbol equations.		
Can write balanced half equations.		
Can state what a mixture is.		
Describe, explain and give examples of the processes of separation of filtration, crystallisation, simple distillation, fractional distillation and chromatography.		
Can suggest appropriate separation techniques when given information, e.g., how would you separate rock salt.		
Can state what Niels Bohr and James Chadwick discovered.		
Can describe the plum pudding model.		
The alpha particle scattering experiment changed the model of the atom to say the nucleus was a dense charged centre. Later work put the electrons orbiting the nucleus.		
Can say why the alpha particle scattering led to a change in the atomic model.		
Can compare the difference between the plum pudding model of the atom and the nuclear model.		
Can give the charges of protons, neutrons and electrons.		
Can state why atoms have no overall electrical charge.		
Can state what the atomic number relates to.		
Can use the nuclear model of protons, neutrons and electrons to describe atoms.		
Can state that atoms are very small and have a radius of about 0.1nm or 1 x 10-10 m.		
Can give the relative masses of the sub-atomic particles.		
Can state what the mass number is.		
Can state what isotopes are.		
Can calculate the number of protons, neutrons and electons in an atom or ion when given its atomic number and mass number.		
Can use relative abundance of isotopes to explain why Chlorine has a mass of 35.5.		
Can calculate the relative atomic mass of an element from the percentage abundance of its isotopes.		
Can describe how electrons are arranged in shells.		
Can represent the electronic structure of an atom by number or a diagram, e.g., for sodium: or 2, 8, 1		
C2 The Periodic Table	**Analysis**	**Revised**
Can state how elements in the periodic table are arranged.		
Can explain why elements are put in groups.		
Can link group number to the number of electrons in the outer shell.		
Can predict possible reactivity of elements from their position in the periodic table, e.g., all group 1 metals will be reactive in a similar way.		
Can describe how elements were ordered in early versions of the periodic table.		
Can explain why Mendeleev left gaps and changed the order of some atomic weights.		
Can describe the development of the periodic table including Newlands and Mendeleev.		
Can recall that metals form positive ions. Hydrogen also forms a positive ion.		

Can recall that non-metals form negative ions.		
Can explain the difference between metals and non-metals on their physical and chemical properties.		
Can explain how reactions of elements are linked to the outer shell electrons which is shown by the atomic number.		
Can recall the name of group 0.		
Can explain they are unreactive and do not easily form molecules because their outer shells are full.		
Can explain how the boiling point of the noble gases increases as you move down the group (get bigger).		
Can recall the name of group 1.		
Can explain how the reactivity of the metals increases down the group.		
Can describe the reactions of Li, Na, K with oxygen, chlorine and water.		
Can recall the name of group 7.		
Can describe the compounds formed when Cl2, Br2 and I2 react with metals and non-metals.		
Can explain how the melting and boiling point increase down the group because the molecules are bigger.		
Can explain why the reactivity decreases going down the group because of the distance between the outer electrons and the nucleus.		
Can write equations to show how a more reactive halogen displaces a less reactive halogen from its salt solution.		
The transition elements are metals with similar properties but different to the properties of group 1 metals.		
Can compare the difference between the transition and group 1 metals in melting points, densities, strengths, hardness and reactivity with oxygen, water and halogens using Cr, Mn, Fe, Co, Ni and Cu.		
C3 Bonding, Structure and the Properties of Matter	**Analysis**	**Revised**
Can identify states of matter from diagrams.		
Can predict the states of substances at different temperatures when given data.		
Can explain the limitations of particles theory where particles are represented by spheres with nor forces shown.		
Can explain why substances change state linking to energy and the breaking of intermolecular forces.		
Can use the state symbols of (s), (l), (g) and (aq).		
Recognise the three types of strong chemical bond: ionic, covalent and metallic.		
In ionic bonding the particles are oppositely charged ions.		
In covalent bonding the particles are atoms that share electrons.		
In metallic bonding the particles are positively charged ions held together by delocalised electrons.		
Can identify the types of atoms that would form ionic bonds.		
Can identify the types of atoms that would form covalent bonds.		
Can describe metallic bonding in words and using a diagram.		
Can describe bonding using the terms electrostatic forces, transfer or sharing of electrons.		
Can draw dot and cross diagrams of ionic bonds between elements in group 1 and 7 and 2 and 6. Try Na and Cl, Mg and O, Ca and Cl and Na and O.		
Can draw these remembering: full outer shell, Square brackets and charge.		
Give the charge on ions using the group number above the column on the periodic table for group 1 and 2 and 6 and 7.		
Describe how ionic compounds are held together.		
Can recognise diagrams of ionic bonds.		
Can describe limitations of dot and cross diagrams, ball and stick diagrams and 2 and 3D diagrams of giant ionic structures, particularly NaCl		
Can describe and explain the properties of ionic compounds in terms of high melting point and whether the conduct electricity.		
Give the empirical (simplest whole number) formula of an ionic compound from the diagram, particularly NaCl.		
Can recognise simple covalent molecules from diagrams or formulas (hint – only a few atoms, e.g., CO2, H2O, C2H4		
Can describe the properties of simple covalent molecules in terms of low melting and boiling point and not conducting electricity.		
Can give the difference between covalent bonds and intermolecular forces and link them to melting and boiling point.		

Can recognise polymers as large covalent molecules from diagrams.		
Can used intermolecular forces to explain why polymers are usually solids at room temperature.		
Can recognise giant covalent structures of diamond, graphite, silicon dioxide and fullerenes from diagrams of their bonding and structure.		
Can explain why giant covalent structures are solid at room temperature and have high melting points.		
Can describe and explain in detail the properties of graphite in terms of being slippery and conducting electricity linking to bonding between carbon atoms and delocalised electrons.		
Can compare graphite to metals.		
Can describe and explain in detail the properties of diamond in terms of being hard, having a high melting point and not conducting electricity.		
Can describe and explain the structure and properties of graphene.		
Can recognise fullerenes from diagrams and descriptions of their structure and bonding.		
Can give examples of the uses of fullerenes including carbon nanotubes.		
Can describe the structure of metallic bonding and use this to explain the properties.		
Give a definition of an alloy.		
Can describe how alloys are harder than pure metals.		
Can describe the size and scale of nanoparticles in terms of numbers of atoms ad standard form and compare to coarse particles.		
Can calculate the surface area of a nanocrystal (cube).		
Can give the properties of nanoparticles in terms of surface area to volume ratio.		
Can describe applications of nanotechnology use in medicine, electronics, sun creams, deodorants and catalysts.		
Can evaluate the uses and risks of the use of nanoparticles.		
C4 Quantitative Chemistry	**Analysis**	**Revised**
Can give the law of conservation of mass.		
Can explain why equations must be balanced.		
Understand what the big number before a formula mean and what the subscript numbers mean.		
Can explain why some reactions appear to have a change in mass by using state symbols to identify a gas.		
Can calculate uncertainty.		
Can recall and define the Avogadro constant.		
Can use Mr of a substance to calculate the number of moles and vice versa.		
Can state what one mole of a substance means relating to atoms, molecules and ions.		
Can identify the number of moles of each substance in a balanced equation.		
Can use Mr moles to calculate the masses of reactants and products from balanced symbol equations.		
Can use Mr moles to balance equations by changing the subject of an equation.		
Can explain why, in reactions, an excess of one of the reactants is used.		
Can identify the limiting reactant from information given.		
Can explain the effect of a limiting quantity of a reactant on the amount of product it is possible to obtain.		
Can give the units for concentration.		
Can calculate the mass of solute in a volume of solution when you know the concentration.		
Can explain how the mass of a solute and volume of a solution is related to the concentration.		
Explain why it is often not possible to obtain 100% yield in a chemical reaction.		
Can calculate the percentage yield of a product from the actual yield of a reaction.		
Can use Mr moles to calculate the theoretical mass of a product from the balanced symbol equation.		
Can calculate the atom economy of a reaction to form a desired product from the balanced symbol equation.		
Can explain why a particular pathway for a reaction is chosen to produce a product given data.		

Can give the units for concentration of a solution.		
Can use nuns can't vote to calculate an unknown concentration from two known volumes and one known concentration. (Titrations)		
Can calculate the volume of a gas at room temperature and pressure from mass and Mr.		
Can calculate gas volumes from balanced equations and given volumes.		
C5 Chemical Changes	**Analysis**	**Revised**
Can state what is produced when metals reacts with Oxygen.		
Can explain reduction and oxidation in terms of Oxygen.		
Can link reactivity of metals to number of outer shell electrons and how easily they form ions.		
Can describe the reactions of metals (K, Na, Li, Ca, Mg, Zn, Fe, Cu) with water and dilute acids and put the metals in order of reactivity.		
Can describe what a displacement reaction is and write equations.		
Can explain why metals less reactive than carbon can be extracted using reduction.		
Can identify where oxidation and reduction has occurred in terms of Oxygen.		
Use OILRIG to explain oxidation and reduction in terms of electrons.		
Can write ionic equations for displacement reactions.		
Can identify which species have been oxidised and reduced in half equations.		
Can state what is produced when acids react with metals that are reactive enough.		
Can explain why acid and metal reactions are redox reactions.		
Can identify which species have been oxidised and reduced in equation.		
Can recall what alkalis and bases are.		
Can give the products when acids are neutralised by alkalis.		
Can give the products when acids are neutralised by metal oxides.		
Can give the products when acids are neutralised by metal carbonates.		
Can name salts made from hydrochloric acid (HCl), nitric acid (HNO3) and sulfuric acid (H2SO4) and the metal in the base, alkali or carbonate.		
Can use the formulae of common ions to give the formula of salts.		
Can describe a method to produce a soluble salt from insoluble metals, metal oxides, metal hydroxides and carbonates including the specific marking points of: · Add base in excess. · Filter excess. · Crystallisation Giving reasons for these.		
Can give details of RP1 preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate.		
Can state what ion makes an aqueous solution acidic.		
Can state what ion makes an aqueous solution alkaline.		
Can use the pH scale of universal indicator to identify solutions which are acidic, alkali and neutral.		
Can use an equation to show how hydrogen ions and hydroxide ions form water to show how neutralisation happens.		
Can describe a method to carry out a titration.		
Can use results from titrations to calculate concentrations using nuns can't vote.		
Can give details of RP2: determination of the reacting volumes of solutions of a strong acid and a strong alkali.		
Can give examples of strong and weak acids.		
Can explain what a weak acid is using degree of ionisation of hydrogen ions.		
Can explain what a strong acid is using degree of ionisation of hydrogen ions.		
Can use the terms dilute and concentration and weak and strong in relation to acids.		

Can link hydrogen ion concentration to pH.		
C6 Electrolysis	**Analysis**	**Revised**
Can explain why solid ionic compounds cannot conduct electricity but molten or dissolved (aq) can.		
Can describe the process and aim of electrolysis.		
Can explain the terms cathode, anode and electrolyte.		
Can explain why graphite electrodes are used.		
Can predict the products of electrolysis of molten compounds such as lead bromide and other simple compounds.		
Can explain why electrolysis is used to extract some metals from their molten compounds.		
Can explain the problems with using electrolysis to extract metals.		
Can explain how aluminium is extracted from aluminium oxide including why the electrolyte is a mixture and why the anode needs constantly replacing.		
Can state how the products of electrolysis are different from aqueous solutions (aq).		
Can predict the products of the electrolysis of aqueous solutions such as NaCl and CuSO4		
Can give details of RP3: Investigate what happens when aqueous solutions are electrolysed using inert electrodes.		
Can write half equations for what happens at the electrodes.		
C7 Energy Changes	**Analysis**	**Revised**
Can explain what an endothermic reaction is in terms of energy.		
Can explain what an endothermic reaction is in terms of energy.		
Can identify exothermic and endothermic reactions from energy changes.		
Can state examples of both exothermic and endothermic reactions.		
Can give and evaluate everyday applications of exothermic and endothermic reactions.		
Can plan how to investigate energy changes remembering the specific marking points of: · Using an insulated beaker or polystyrene cup to prevent energy loss. · Using a thermometer with a high resolution to monitor temperature changes.		
Can give details of RP4: Investigate the variables that affect temperature changes in reacting solutions such as acid + metal, Acid + carbonate, neutralisation and displacement.		
Can draw simple reaction profiles (energy level diagrams) for exothermic and endothermic reactions.		
Can identify activation energy on these diagrams.		
Can use a reaction profile to identify if the reaction is exothermic or endothermic.		
Describe energy in a reaction relating to energy to break bonds and energy released when making bonds.		
Can calculate the energy transferred in reactions using bond energies supplied.		
Can state what chemical cells and batteries are.		
Can describe how to set up a simple chemical cell.		
Can explain how some batteries are rechargeable and some are not.		
Can identify the most reactive metal from data given.		
Can describe hydrogen oxygen fuel cells.		
Can evaluate the use of hydrogen fuel cells compared to rechargeable batteries.		
Can write equations for the electrodes in hydrogen fuel cells.		