G.C.S.E Combined Science

1 Easiest – 4 Hardest

Biology Paper 1	1hr 15	70 marks	16.7%
Cell Biology			
1	Eukaryotes: Animal and plant cells - labelling organelles and giving their jobs		
2	Prokaryotes: Bacterial cells – labelling organelles and giving their jobs		
3	Specialisation and differentiation of animal and plant cells		
1	Names and jobs of specialised cells		
2	Adaptations of specialised cells		
2	**RP - Microscopes**		
1	The magnification equation (off by heart)		
1	The 3 stage of the cell cycle		
2	Mitosis		
1	Stem cells – knowing the two types		
1	Meristems		
2	Diffusion		
3	Osmosis		
3	**RP - Osmosis**		
3	Active transport		
4	Comparing and problem solving with diffusion osmosis and active transport		
Organisation			
1	Definitions and examples of cells, tissues and organs		
1	Parts of the digestive system and their jobs		
1	**RP – food tests**		
2	Enzymes; lipase, amylase and proteas. What they do and where they are found in the body		
2	Bile and emulsification		
4	**RP – pH affecting Amylase**		
2	Parts of the heart		
2	Naming the three blood vessels and describing their features		
2	The four parts of the blood and their jobs		
2	Heart diseases and health issues		
2	Non-communicable diseases and causes		
	Obesity & BMI		
2	Knowing the different tissues in a leaf and their jobs		
1	Xylem and phloem		
3	Stomata, guard cells and transpiration		
4	Transpiration and Translocation		
Infection and response			
1	Definitions of communicable diseases and non-communicable disease		
3	Viral, bacterial, fungal and protist, how they behave		
2	Details of; Influenza, Measles, Salmonella, HIV, Malaria, gonorrhoea,		
2	Details of plant diseases including TMV and Rose Black Spot		
2	Human defences: The non specific immune system		
3	Human defences: The specific immune system (three roles of the white blood cells)		
3	Vaccinations		

1	Antibiotics and Painkillers	
1	Where aspirin, digitalis and penicillin come from	
2	Drug Trials and the stages involved	
Bioenergetics		
1	Photosynthesis equation (symbol & word)	
3	Rate of photosynthesis and the four factors that affect it	
2	**RP – Light intensity on the rate of photosynthesis**	
2	Uses of glucose from photosynthesis	
3	Aerobic and anaerobic respiration equations (symbol & word)	
3	Responses to exercise – how the lungs, heart and skin respond	
3	Metabolism and break down of lactic acid	

Chemistry Paper 1	**1hr 15**	**70 marks**	**16.7%**
Atomic Structure and the Periodic Table			
1	Atoms, elements and compounds definitions (and diagrams)		
1	Mixtures definitions (and diagrams)		
2	Developing the model of the atom (Dalton, JJ Thompsons, Rutherford, Bohr)		
2	Draw and label a diagram of the atom with charges and relative masses (protons, neutrons and electrons)		
3	Size and mass of atoms		
3	Relative Atomic Mass and Proton Number		
2	Electronic structure and how they are arranged on shells		
3	How the periodic table is structured		
2	The development of the periodic table (Newlands & Mendeleev)		
1	Metals and non-metals and the line that separates them on the periodic table		
4	Group 1 of the PT – The name, reactions (with oxygen, burning and water) and trends		
4	Group 7 of the PT – The name, reactions (displacement) and trends		
2	Group 0 - Group 1 of the PT – The name and why they are unreactive		
1	Transition Metals - Group 1 of the PT – Typical properties of metals		
Bonding, Structure and Property of Matter			
1	The three types of bonding and when they happen (metals and non-metals)		
2	Drawing and Describing Ionic Bonds		
3	Properties of Giant Ionic Lattices (and what states they can conduct electricity)		
2	Drawing and Describing Covalent Bonds		
4	Properties of simple covalent molecules (small molecules)		
3	Giant covalent structures (including diamond, graphite, graphene and fullerenes) including bonding and properties		
2	Allotropes of carbon		
2	Metallic bonding and the structure in metals		
3	How metals conduct electricity		
2	What Alloys are and why they are strong		
2	Describing states of matter and state symbols		
2	What Polymers are		

Quantitative chemistry		
2	Conservation of mass	
2	Relative formula mass and how to calculate it using the periodic table	
2	Percentage of Mass	
3	Mass changes during a reaction and losing or gaining gases	
3	Chemical measurements	
1	Learning the moles equation (HT)	
3	Calculating moles and moles in equations (HT)	
4	Masses of substances in equations (HT) (Reacting Masses)	
4	Limiting reactants (HT)	
2	Converting to dm^3 from cm^3	
1	Concentrations of solutions definition	
1	Learning and applying the concentration equation	
Chemical Changes		
1	Metal ore (oxides)	
1	Learning the order of the reactivity series	
3	Describing reactivity in the reactivity series	
3	Extraction of metals and when reduction using carbon and electrolysis is used	
2	Reduction using carbon	
	Oxidation & Reduction	
3	Reduction and details to extract iron using the blast furnace	
2	Reactions of acids with metals – word and symbol equations	
2	Difference and similarities between alkalis and bases	
2	Neutralisation of acids and salt production - word and symbol equations	
1	Learn the ionic equation of neutralisation	
4	Describe the meaning of strong/weak/Dilute and Concentrated acids	
2	**RP – making salts from acids & insoluble bases**	
2	Naming salts correctly from the acid and base name	
2	Electrolysis equipment and what happens during the electrolysis of molten compounds	
2	Electrolysis equipment (and crylolite) during the electrolysis of aluminium oxide	
4	**RP - Electrolysis of solutions**	
Energy Changes		
1	Definitions of exothermic and endothermic reactions	
2	Definition and understanding of the term Activation Energy	
2	**RP – energy changes in chemical reactions**	
2	Reaction profiles	
4	Energy changes of reactions in terms of bonds breaking and forming (HT)	
3	Bond Energy Calculations (HT)	

Physics Paper 1	1hr 15	70 marks	16.7%
Energy			
2	Energy stores and systems		
3	GPE & Kinetic		
2	Useful and wasted energy for different appliances		
2	Lubricants		
3	The law of conservation of energy		
4	Reading and understanding Sankey Diagrams		
3	Power definition and units		
3	Energy transfers in a system		
2	Efficiency definition and how to calculate it		
1	Renewable & non-renewable energy definitions		
1	Reliable & non-reliable sources		
1	Start-up time		
2	How different power stations/resources work; wind turbines, Biogas, Biofuel, coal/oil/Gas, hydroelectric, solar, tidal, nuclear		
3	Advantages and disadvantages of all the above		
Electricity			
1	Circuit symbols		
2	Drawing circuits including putting ammeters and voltmeter in the correct place		
3	Electrical charge and current; definitions, units and equation		
3	Current resistant and potential difference; definitions, units and equation		
3	Resistance; definitions, units		
2	LDRs and Thermistors		
3	**RP – I-V characteristics of circuit components making sure you know the shapes of the graphs**		
2	Series and parallel circuits; how to draw them and the differences		
4	Series and Parallel circuit rules for current, PD and resistance		
3	Direct and alternating potential difference (AC-DC)		
2	Mains electricity including the mains PD and Frequency		
4	Power ($P = V \times I$; $P = I^2 \times R$)		
3	Energy transfers in everyday appliances		
2	What makes up the national grid, including the role of transformers		
Particle Model of Matter			
1	Density definition and units		
1	Learn the density equation		
2	**RP – Density of regular and irregular objects**		
2	Changes of state; condensation, evaporation, freezing and melting		
3	**Detailed description of the above**		
2	Internal energy definition		
2	Temperature changes in a system		
1	Specific heat capacity definition (you get given the equation)		

3	**RP – Specific heat Capacity Practical**	
4	Rearranging the specific Heat capacity Equation	
2	Specific latent heat of fusion/vaporisation definitions	
2	Using the specific latent heat equation (you get given this)	
2	Particle motion in gases and how they behave	

Atomic Structure		
1	The structure of an atom	
2	Mass number, atomic number	
2	Definition and structure of isotopes	
2	The development of the atomic model (also in chemistry)	
3	Rutherford Scattering Experiment	
2	Radioactive decay and nuclear radiation (Alpha, Beta, Gamma)	
2	Count rate and changes in count rate	
3	Nuclear equations (alpha and beta)	
2	Random nature of decay	
1	Half – life and half-life graphs and calculations	
1	Radioactive contamination and irradiation	

Biology Paper 2	**1hr 15**	**70 marks**	**16.7%**
Homeostasis and response			
2	Homeostasis		
2	The nervous system		
1	Definitions of stimulus, receptor and effector		
3	The reflex arc (including the order)		
2	**RP – Reaction Time – ruler drop test**		
1	Human endocrine system including location of glands		
1	What hormones do in body		
3	Controlling blood glucose concentration		
4	Puberty and the menstrual cycle, including the jobs of the four female hormones		
2	Contraception including barrier and hormonal methods		
3	Infertile and IVF		
4	Negative feedback (HT)		
Inheritance			
1	Sexual and asexual reproduction		
3	Mitosis and the stages involved		
4	Meiosis and the stages involved		
1	Fertilisation		
1	DNA organisation including understanding of DNA, Double helix, Gene, Chromosomes		
2	The Human Genome and why it is important		
3	Understanding of the words; alleles, homozygous, heterozygous, genotype and phenotype		

3	Genetic inheritance including completing punnet squares and analysing result	
4	Inherited disorders including knowledge of Polydactyl, Cystic Fibrosis and Huntington's Disease	
3	Genetic screening (linking to IVF)	
3	Family trees	
1	Sex determination and understanding of XX XY chromosomes	

Variation and Evolution		
2	Variation	
2	Mutations	
3	Evolution by natural selection	
4	Resistant bacteria and how to prevent it	
1	Selective breeding	
1	Genetic engineering	
1	Evidence for evolution	
1	Fossils	
1	Extinction – Biotic and Abiotic causes	
3	Evolution of resistant bacteria	
1	The order of classification – king Philip came….	
2	Analysing classification diagrams	
3	Describing how classification has got more accurate over time	
Ecology		
1	Definitions of: Communities, population, habitat	
1	Abiotic and biotic factors	
3	Adaptations of plants and animals	
1	Definitions of; producers, primary/secondary consumer/predator/prey/apex predator	
3	Analysing food webs and food chains	
2	**RP – Sampling techniques to measure population sizes using quadrats**	
1	Water Cycle	
2	Carbon Cycle	
2	Defining Biodiversity	
2	Waste management	
2	Land use	
2	Deforestation	
1	Naming greenhouse gases	
3	Global Warming	
2	Maintaining Biodiversity	

Chemistry Paper 2	**1hr 15**	**70 marks**	**16.7%**
The Rate of Chemical Change			

2	Measuring rate of reaction in practical's using gas syringes and balances	
3	Calculating rates of reactions	
	Using a tangent to calculate rates (H)	
3	Factors affecting rates of reactions (concentration, pressure, temperature, catalysts, surface area)	
3	**RP – rates of chemical reactions changing concentration of sodium thiosulphate**	
4	Collision theory and activation energy	
2	Reversible reactions and symbol in equations	
3	Equilibrium in reactions	
4	Changing conditions equilibrium (temp,pressure,conc) (HT)	
Organic Chemistry		
2	Crude oil, hydrocarbons, alkenes and alkanes	
2	Naming alkanes and alkenes with 1-5 carbons	
3	Fractional distillation process	
1	Uses of products of fractional distillation	
4	Trend of hydrocarbons with different chain lengths	
1	The three conditions needed for cracking	
3	Cracking drawings and equations	
Chemical Analysis		
1	Pure & impure substances	
3	Melting and boiling points and pure & impure substances	
1	Formulations	
2	**RP – Chromatography and calculating Rf values**	
2	Comparing substances based on Rf values	
1	Gas test for hydrogen, oxygen, carbon dioxide and chlorine	
Chemistry of the atmosphere		
1	Proportion of gases in the atmosphere currently	
2	Earth's early atmosphere and changes in O_2 and CO_2	
2	Greenhouse gases and the effects of human activity	
1	Global climate change and it's impacts	
2	The carbon footprint	
2	Deforestation and links to CO2	
3	Atmospheric pollutants and how they are formed from fuels including carbon dioxide, sulphur dioxide, carbon particulates and nitrous oxides	
2	Properties and effects of atmospheric pollutants (above)	
Using Resources		
2	Earth's resources and sustainable development	
1	Potable water	
3	**RP – Distillation and measuring dissolved solid in water samples**	
2	Waste water treatment and stages	
2	Alternative methods of extracting metals (HT) phytomining and bioleaching	
2	Life cycle assessment and the four stages	
2	Ways of reducing the use of resources	
2	Recycling	

Physics Paper 2	1hr 15	70 marks	16.7%
Forces			
1	Scalar and vector quantities		
1	Contact and non-contact forces		
2	Gravity and weight		
2	Terminal Velocity		
2	Resultant forces		
2	Drawing scale force diagrams		
3	Resultant forces at right angles		
2	Work done and energy transfers		
2	Forces and elasticity		
2	**RP – Hooke's Law and Spring Constant**		
2	Spring Constant Calculations and units		
1	The difference between Distance and displacement		
1	The difference between Speed and velocity		
3	Distance-time graphs		
3	Velocity – time graphs		
4	Calculating distance from velocity -time graphs (HT)		
2	Definition of acceleration, units and calculation		
	Definition of deceleration, units and calculating		
4	Calculating acceleration from a velocity – time graph		
2	Newton's 3 laws of motion		
2	Stopping distance		
2	Reaction time		
2	Factors affecting braking distance and thinking distance		
4	Momentum definition and calculations (HT)		
4	Conservation of momentum (HT)		
Waves			
1	Transverse and longitudinal waves		
3	Properties of waves of transvers and longitudinal waves		
2	Sound waves and ultrasound		
3	Using speed, distance time to calculate speed/distance of sound		
2	Frequency definition and calculations		
2	Learning and using the equation frequency, wave speed and wave length		
1	The order of the electromagnetic spectrum		
3	Electromagnetic waves (properties and uses)		
1	Reflection		
2	Refraction		
3	**RP – Infrared absorption and emission – Leslie Cube**		
Magnetism and Electromagnetism			
2	Poles of a magnet and drawing magnetic fields		
1	Solenoids		
1	Describing when magnets attract and repel		
2	Electromagnetism and building an electromagnet		
2	Why electromagnetism is useful		
4	Fleming's left-hand rule (HT)		
4	Electric motors (HT)		