NOTTINGHAM BRITISH SCHOOL – CURRICULUM DEVELOPMENT 2019

Year 11 Physics

STRAND	October Assessment	December Assessment	March Assessment	June Assessment	Age Related Expectation By the end of the year every student will be able to ….
General Physics	*Electrical quantities* *Electric charge and electric fields* • State that there are positive and negative charges • State that unlike charges attract and that like charges repel • Describe simple experiments to show the production and detection of electrostatic charges • State that charging a body involves the addition or removal of electrons • Distinguish between electrical conductors and insulators and give typical examples • State that charge is measured in coulombs • State that the direction of an electric field at a	*Force on a current-carrying conductor* • Describe an experiment to show that a force acts on a current-carrying conductor in a magnetic field, including the effect of reversing: – the current – the direction of the field Supplement • State and use the relative directions of force, field and current • Describe an experiment to show the corresponding force on beams of charged particles *d.c. motor* • State that a current-carrying coil in a magnetic field experiences a turning effect and that the effect is increased by: – increasing the number of turns on the coil – increasing the current – increasing the strength of the magnetic field • Relate this turning effect to the action of an electric motor including the action of a split-ring commutator	*Thermionic emission* Characteristics of the three kinds of emission • Discuss the random nature of radioactive emission • Identify α-, β- and γ-emissions by recalling – their nature – their relative ionising effects – their relative penetrating abilities (β+ are not included, β- particles will be taken to refer to β–) • Describe their deflection in electric fields and in magnetic fields • Interpret their relative ionising effects • Give and explain examples of practical applications of α-, β- and γ-emissions 5.2.3 *Radioactive decay* • State the meaning of radioactive decay		***AO1 Knowledge with understanding*** Students should be able to demonstrate knowledge and understanding of: • scientific phenomena, facts, laws, definitions, concepts and theories • scientific vocabulary, terminology and conventions (including symbols, quantities and units) • scientific instruments and apparatus, including techniques of operation and aspects of safety • scientific and technological

	point is the direction of the force on a positive charge at that point • Describe an electric field as a region in which an electric charge experiences a force • Describe simple field patterns, including the field around a point charge, the field around a charged conducting sphere and the field between two parallel plates (not including end effects) • Give an account of charging by induction • Recall and use a simple electron model to distinguish between conductors and insulators <u>*Electrical circuits, components and symbols*</u> Circuit diagrams • Draw and interpret circuit diagrams containing sources,	<u>*a.c. generator*</u> • Distinguish between d.c. and a.c. • Describe and explain a rotating-coil generator and the use of slip rings • Sketch a graph of voltage output against time for a simple a.c. generator • Relate the position of the generator coil to the peaks and zeros of the voltage output <u>*Transformer*</u> • Describe the construction of a basic transformer with a soft-iron core, as used for voltage transformations • Recall and use the equation (Vp /Vs) = (Np /Ns) • Understand the terms step-up and step-down • Describe the use of the transformer in high voltage transmission of electricity • Give the advantages of high-voltage transmission Supplement • Describe the principle of operation of a transformer • Recall and use the equation	• State that during α- or β-decay the nucleus changes to that of a different element • Use equations involving nuclide notation to represent changes in the composition of the nucleus when particles are emitted <u>Half-life</u> • Use the term half-life in simple calculations, which might involve information in tables or decay curves • Calculate half-life from data or decay curves from which background radiation has not been subtracted <u>Safety precautions</u> • Recall the effects of ionising radiations on living things • Describe how radioactive materials are handled, used and stored in a safe way End of IGCSE Physics syllabus Note:		applications with their social, economic and environmental implications. Subject content defines the factual material that candidates may be required to recall and explain. Candidates will also be asked questions which require them to apply this material to unfamiliar contexts and to apply knowledge from one area of the syllabus to another. ***<u>AO2 Handling information and problem solving</u>*** Students should be able, in words or using other written forms of presentation (i.e. symbolic, graphical and numerical), to: • locate, select, organise and present information from a

	switches, resistors (fixed and variable), heaters, thermistors, light-dependent resistors, lamps, ammeters, voltmeters, galvanometers, magnetising coils, transformers, bells, fuses and relays • Draw and interpret circuit diagrams containing diodes <u>*Current*</u> • State that current is related to the flow of charge • Use and describe the use of an ammeter, both analogue and digital • State that current in metals is due to a flow of electrons • Show understanding that a current is a rate of flow of charge and recall and use the equation I = Q/t • Distinguish between the direction of flow of electrons and	IpVp = IsVs (for 100% efficiency) • Explain why power losses in cables are lower when the voltage is high <u>*Atomic Physics*</u> <u>*The nuclear atom*</u> <u>Atomic model</u> • Describe the structure of an atom in terms of a positive nucleus and negative electrons Supplement • Describe how the scattering of α-particles by thin metal foils provides evidence for the nuclear atom <u>*Nucleus*</u> • Describe the composition of the nucleus in terms of protons and neutrons • State the charges of protons and neutrons • Use the term proton number Z • Use the term nucleon number A • Use the term nuclide and use the nuclide notation A ZX • Use and explain the term isotope • State the meaning of nuclear fission and nuclear fusion	The whole syllabus will be delivered by the middle of March to allow time (5-6 weeks) before final exams for revision and revisiting the most demanding past exam papers question. ***<u>Assessment for learning</u>*** • Weekly quick quiz (20 min) • End of Chapter test (every 6-8 lessons) • Practise answering past exam papers questions • Self assessment • Peer assessment • End of half term test		variety of sources • translate information from one form to another • manipulate numerical and other data • use information to identify patterns, report trends and draw inferences • present reasoned explanations for phenomena, patterns and relationships • make predictions and hypotheses • solve problems, including some of a quantitative nature. Questions testing these skills may be based on information that is unfamiliar to candidates, requiring them to apply the

	conventional current *Electromotive force* • State that the electromotive force (e.m.f.) of an electrical source of energy is measured in volts • Show understanding that e.m.f. is defined in terms of energy supplied by a source in driving charge round a complete circuit *Potential difference* • State that the potential difference (p.d.) across a circuit component is measured in volts • Use and describe the use of a voltmeter, both analogue and digital Supplement • Recall that 1V is equivalent to 1J/C 4.2.5 *Resistance* • State that resistance = p.d./ current and understand qualitatively how changes in p.d. or resistance affect current	• Balance equations involving nuclide notation *Radioactivity* *Detection of radioactivity* • Demonstrate understanding of background radiation • Describe the detection of α-particles, β-particles and γ-rays (β+ are not included: β-particles will be taken to refer to β– *Digital electronics* • Explain and use the terms analogue and digital in terms of continuous variation and high/low states • Describe the action of NOT, AND, OR, NAND and NOR gates • Recall and use the symbols for logic gates • Design and understand simple digital circuits combining several logic gates • Use truth tables to describe the action of individual gates and simple combinations of gates			principles and concepts from the syllabus to a new situation, in a logical, deductive way. ***AO3 Experimental skills and investigation*** Students should be able to: • demonstrate knowledge of how to safely use techniques, apparatus and materials (including following a sequence of instructions where appropriate) • plan experiments and investigations • make and record observations, measurements and estimates • interpret and evaluate experimental

	• Recall and use the equation R = V/ I • Describe an experiment to determine resistance using a voltmeter and an ammeter • Relate (without calculation) the resistance of a wire to its length and to its diameter • Sketch and explain the current–voltage characteristic of an ohmic resistor and a filament lamp • Recall and use quantitatively the proportionality between resistance and length, and the inverse proportionality between resistance and crosssectional area of a wire *<u>Series and parallel circuits</u>* • Understand that the current at every point in a series circuit is the same				observations and data

	• Give the combined resistance of two or more resistors in series • State that, for a parallel circuit, the current from the source is larger than the current in each branch • State that the combined resistance of two resistors in parallel is less than that of either resistor by itself • State the advantages of connecting lamps in parallel in a lighting circuit Supplement • Calculate the combined e.m.f. of several sources in series • Recall and use the fact that the sum of the p.d.s across the components in a series circuit is equal to the total p.d. across the supply • Recall and use the fact that the current from the source is the				

	sum of the currents in the separate branches of a parallel circuit • Calculate the effective resistance of two resistors in parallel Electrical working • Understand that electric circuits transfer energy from the battery or power source to the circuit components then into the surroundings • Recall and use the equations P = IV and E = IVt *Dangers of electricity* • State the hazards of: – damaged insulation – overheating of cables – damp conditions • State that a fuse protects a circuit • Explain the use of fuses and circuit breakers and choose appropriate fuse ratings and				

	circuitbreaker settings • Explain the benefits of earthing metal cases <u>*Simple phenomena of magnetism*</u> • Describe the forces between magnets, and between magnets and magnetic materials • Give an account of induced magnetism • Distinguish between magnetic and nonmagnetic materials • Describe methods of magnetisation, to include stroking with a magnet, use of d.c. in a coil and hammering in a magnetic field • Draw the pattern of magnetic field lines around a bar magnet • Describe an experiment to identify the pattern of magnetic field lines,				

	including the direction • Distinguish between the magnetic properties of soft iron and steel • Distinguish between the design and use of permanent magnets and electromagnets *<u>The magnetic effect of a current</u>* • Describe the pattern of the magnetic field (including direction) due to currents in straight wires and in solenoids • Describe applications of the magnetic effect of current, including the action of a relay Supplement • State the qualitative variation of the strength of the magnetic field over salient parts of the pattern • State that the direction of a magnetic field line at				

	a point is the direction of the force on the N pole of a magnet at that point • Describe the effect on the magnetic field of changing the magnitude and direction of the current ***<u>Assessment for learning</u>*** • Weekly quick quiz (20 min) • End of Chapter test (every 6-8 lessons) • Practise answering past exam paper questions • Self assessment • Peer assessment • End of half term test	***<u>Assessment for learning</u>*** • Weekly quick quiz (20 min) • End of Chapter test (every 6-8 lessons) • Practise answering past exam paper questions • Self assessment • Peer assessment • End of half term test			

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