

OCR Year 12 AS Level Physics – Overview

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Foundations - quantities and units; derived units; scalar and vector quantities Foundations - adding vectors; resolving vectors; more on vectors. Motion- distance and speed; displacement and velocity; acceleration. Motion – more on velocity-time graphs; equations of motion; car stopping distances (Exp). Motion – free fall and g (Exp); projectile motion. Forces in action – force, mass and weight; centre of mass; free-body force diagrams. Topic test and review PAG 1.1 Laws of motion and momentum-Newton’s first and third law of	Forces in action – drag and terminal velocity; moments and equilibrium. Forces in action-couples and torques; triangle of forces Forces in action-density and pressure=$h\rho g$ and Archimedes’ principle. Work, energy and power-work done and energy; conservation of energy; kinetic energy and gravitational potential energy. Work, energy and power-power and efficiency. Materials-springs and Hooke’s law; elastic. potential energy Materials-Deforming materials; stress strain and the Young modulus. Topic test and review PAG 2.2/2.1	Charge and current - current and charge; moving charges Charge and current-Kirchhoff’s first law. Charge and current - mean drift velocity Energy, power and resistance – circuit symbols; potential difference and electromotive force. Energy, power and resistance - the electron gun Energy, power and resistance - resistance PAG 3.1 Energy, power and resistance – I-V characteristics; diodes Energy, power and resistance-resistance and resistivity. Energy, power and resistance-the thermistor; the LDR. Energy, power and resistance-electrical energy and power.	Waves 1-progressive waves; wave properties; reflection and refraction; diffraction and polarisation. Waves 1-intensity; electromagnetic waves; polarisation of electromagnetic waves. Waves 1-Refractive index; total internal reflection Topic test and review PAG 5.1 Waves 2-superposition of waves; interference; Young double slit experiment. Waves 2-Young double slit experiment; stationary waves Waves 2-harmonics; stationary waves in air columns. Topic test and review Topic test and review PAG 5.3	Quantum physics-the photon model. Quantum physics-the photoelectric effect. Quantum physics-Einstein’s photoelectric effect equation. Quantum physics-wave-particle duality. Topic test and review. PAG 6.2	SUMMER TERM YEAR 13 TOPICS BEGINS Thermal physics-temperature; solids, liquids and gases Thermal physics-internal energy. Thermal physics-specific heat capacity. PAG11.2 Thermal physics-specific latent heat. Ideal gases-the kinetic theory of gases. Ideal gases-gas laws (Exp) Ideal gases-root mean square speed; the Boltzmann constant (PAG).PAG 8.2

motion; linear momentum. Laws of motion and momentum-Newton's second law of motion; impulse; collisions in two dimensions		Energy, power and resistance-paying for electricity. Topic test and review. Electrical circuits-Kirchhoff's laws and circuits. Electrical circuits-combining resistors. Electrical circuits-analysing circuits. Electrical circuits-internal resistance. Electrical circuits-potential divider circuits; sensing circuits. Topic test and review. PAG 4.1			

OCR Year 13 A Level Physics – Overview

Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Circular motion-Angular velocity and the radian; angular acceleration. Circular motion- exploring centripetal forces (Exp). Oscillations-oscillations and simple harmonic motion; analysing simple harmonic motion. Oscillations-Simple harmonic motion and energy; damping and driving (Exp). Oscillations-Resonance. Gravitational fields-gravitational fields; Newton's law of gravitation. Gravitational fields-gravitational field strength for a point mass; Kepler's laws Gravitational fields-satellites; gravitational potential; gravitational potential energy	Capacitance – capacitors; capacitors in circuits. Capacitors-energy stored by capacitors. Capacitors-discharging capacitors (Exp). Capacitors-charging(Exp) PAG 9.1 Capacitors-uses of capacitors. Topic test and review Particle Physics-Alpha-particle scattering experiment; the nucleus. Particle Physics-antiparticles, hadrons, and leptons; quarks; beta decay. Radioactivity-radioactivity; nuclear decay equations; half-life and activity.	Astrophysics Stars –objects in the Universe; life cycle of stars. Stars –the Hertzsprung Russell diagram. Cosmology-astronomical distances. Cosmology-the Doppler effect; Hubble's law. Cosmology-the Big Bang theory. Cosmology-evolution of the Universe. Topic test and review.	Medical imaging-X-rays; interaction of X-rays with matter; CAT scans. Medical imaging-the gamma camera, PET scans; ultrasound. Medical imaging-Acoustic impedance; Doppler imaging. Topic test and review Topic test and review PAG 12.1 PREPARATION FOR FINAL EXAMS		

Topic test and review PAG 10.1					
Electric fields-electric fields; Coulomb's law; uniform electric fields and capacitance. Electric fields-charged particles in uniform electric fields, electric potential and energy Magnetic fields-magnetic fields; understanding magnetic fields. Magnetic fields –charged particles in magnetic fields; electromagnetic induction. Magnetic fields-Faraday's law and Lenz's law; transformers. PAG 11.1 Topic test and review. .	Radioactivity-radioactive decay calculations; modelling radioactive decay (Exp). Radioactivity-Radioactive dating. Nuclear Physics-Einstein's mass-energy equation. Nuclear Physics-binding energy; nuclear fission; nuclear fusion. Topic test and review PAG 7.2				