

Year 1

1.	MEASUREMENTS & THEIR ERRORS	Rate 1 to 5
a.	Fundamental & SI units	
b.	Prefixes (T, G, M, k, c, m, μ , n, p, f)	
c.	Random & systematic errors	
d.	Precision, resolution & accuracy	
e.	Absolute, fractional & percentage uncertainties	
f.	Combining uncertainties	
g.	Uncertainties on graphs	
h.	Estimating values	

2.	PARTICLES & RADIATION	Rate 1 to 5
a.	Constituents of the atom	
b.	Specific charge	
c.	Nuclide notation & isotopes	
d.	The strong nuclear force	
e.	Alpha & beta decay	
f.	Antiparticles	
g.	The photon model	
h.	Annihilation & pair production	
i.	Particle interactions & exchange particles (inc. Feynman diagrams)	
j.	Hadrons & leptons	
k.	Strangeness	
l.	Quarks & antiquarks	
m.	Conservation laws	
n.	The photoelectric effect	
o.	Energy levels & line spectra	
p.	The fluorescent tube	
q.	De Broglie wavelength & electron diffraction	

3.	WAVES	Rate 1 to 5
a.	Properties of progressive waves	
b.	Longitudinal & transverse waves	
c.	Polarisation	
d.	Stationary waves [RP 1]	
e.	Young's double slit experiment [RP 2]	
f.	Single slit diffraction	
g.	Diffraction gratings	
h.	Snell's law of refraction	
i.	Total internal reflection	
j.	Optical fibres	

4.	MECHANICS & MATERIALS	Rate 1 to 5
a.	Adding & resolving vectors	
b.	Moments	
c.	Centre of mass	
d.	Motion time graphs	
e.	Uniform acceleration equations [RP 3]	
f.	Projectile motion	
g.	Terminal speed	
h.	Newton's laws of motion	
i.	Momentum & impulse	
j.	Work, power & efficiency	
k.	Conservation of energy	
l.	Density	
m.	Hooke's law	
n.	Force-extension graphs	
o.	Stress-strain curves	
p.	The Young modulus [RP 4]	

5.	ELECTRICITY	Rate 1 to 5
a.	Current, potential difference & resistance	
b.	Current-voltage characteristics	
c.	Resistivity [RP 5]	
d.	Semiconductors & superconductors	
e.	Resistors in series & parallel	
f.	Conservation of charge & energy	
g.	The potential divider	
h.	Electromotive force (emf) and internal resistance [RP 6]	

REQUIRED PRACTICALS		Rate 1 to 5
RP 1.	Investigate how the frequency of stationary waves on a string varies with length, tension, and mass per unit length.	
RP 2.	Investigate interference in Young's slit experiment, and interference by a diffraction grating.	
RP 3.	Determine g by a free-fall method.	
RP 4.	Determine the Young modulus.	
RP 5.	Determine resistivity of a wire.	
RP 6.	Investigate the emf and internal resistance of cells & batteries.	

Year 2

6.	FURTHER MECHANICS AND THERMAL PHYSICS	Rate 1 to 5
a.	Circular motion	
b.	Simple harmonic motion (SHM)	
c.	Mass-spring system [RP 7]	
d.	Simple pendulum [RP 7]	
e.	Damping	
f.	Forced vibrations & resonance	
g.	Internal energy	
h.	Specific heat capacity (inc. continuous flow calculations)	
i.	Specific latent heat	
j.	The gas laws [RP 8]	
k.	Ideal gas equation	
l.	Brownian motion	
m.	Molecular kinetic theory model	

7.	FIELDS & THEIR CONSEQUENCES	Rate 1 to 5
a.	Newton's law of gravitation	
b.	Gravitational field strength (g)	
c.	Gravitational potential (V)	
d.	Graphs of g and V versus r	
e.	Orbits of planets & satellites	
f.	Coulomb's law	
g.	Electric field strength (E)	
h.	Charged particle in a uniform electric field	
i.	Electric potential (V)	
j.	Graphs of E and V versus r	
k.	Comparison of electric & gravitational fields	
l.	Parallel plate capacitor	
m.	Energy stored by a capacitor	
n.	Capacitor charge & discharge [RP 9]	
o.	Current-carrying wire in a magnetic field [RP 10]	
p.	Charged particle in a magnetic field	
q.	Magnetic flux & flux linkage [RP 11]	
r.	Electromagnetic induction	
s.	Alternating currents	
t.	Transformers	

8.	NUCLEAR PHYSICS	Rate 1 to 5
a.	Rutherford scattering	
b.	Ionising radiation	
c.	Background radiation	
d.	The inverse-square law [RP 12]	
e.	The decay equation	
f.	Half-life	
g.	Nuclear instability	
h.	Nuclear radius & density	

i.	Mass difference & binding energy	
j.	Fission & fusion	
k.	Thermal nuclear reactor	
l.	Safety & radioactive waste	

Options

9.	ASTROPHYSICS	Rate 1 to 5
a.	Refracting telescopes	
b.	Reflecting telescopes	
c.	Refracting vs reflecting telescopes	
d.	Radio, IR, UV, and X-ray telescopes	
e.	Advantages of large diameter telescopes	
f.	CCD vs the eye	
g.	Apparent & absolute magnitude	
h.	Wien's displacement law & black-body curves	
i.	Stefan's law	
j.	Stellar spectral classes	
k.	Hertzsprung-Russell (HR) diagram	
l.	Supernovae, neutron stars & black holes	
m.	Doppler effect	
n.	Hubble's law & evidence for Big Bang theory	
o.	Quasars	
p.	Exoplanets	

REQUIRED PRACTICALS		Rate 1 to 5
RP 7.	Investigate simple harmonic motion using a mass-spring system and a simple pendulum.	
RP 8.	Investigate Boyle's law and Charles law for a gas.	
RP 9.	Investigate the charge & discharge of capacitors and determine the time constant RC.	
RP 10.	Investigate how force on a wire varies with flux density, current, and length of wire, using a top-pan balance.	
RP 11.	Investigate the effect on magnetic flux linkage of varying the angle between a search coil & the magnetic field.	
RP 12.	Investigate the inverse-square law for gamma radiation.	

ASSESSMENTS	Duration	Marks	Sections	Weighting
A-Level Paper 1 20/05/2026	2 hours	85	1 to 6f	34%
A-Level Paper 2 01/06/2026	2 hours	85	6g to 8	34%
A-Level Paper 3 08/06/2026	2 hours	80	Practical skills and data analysis, and section 9	32%