

## Suggested Study Plan Higher Physics Exam Date – Tuesday May 8<sup>th</sup> at 9am – 11.30am

You must always write something down when you are studying. Use sharp pencils, rulers a good calculator and clean paper. TURN YOUR PHONE OFF.

Make mind maps, bullet point, make flash cards, do past paper questions and check model answers, write out symbols, units, formula and rearrange.

Week	What to study	Formula	Things to work on
1	Uncertainties, data handling, trig, rearranging equations, symbols, units, prefixes. Atomic structure, history of the atom. Standard model, particle physics, electric fields, forces on a particle in electric and magnetic fields, particle accelerators, nuclear fission/fusion,	$\text{Rand Unc} = (\text{max}-\text{min})/N$ $E=QV, E=1/2mv^2, E=mc^2$	
2	Wave particle duality, photoelectric effect, interference and diffraction, gratings,	$v=f\lambda, E=hf, E=hf - hf_0, E=1/2mv^2,$ $d\sin\theta=m\lambda$ $\text{path diff} = m\lambda \text{ or } (m+1/2)\lambda$	
3	Refraction, critical angle, Irradiance, inverse square law, emission and absorption spectra, Bohr atom	$n=(\sin\theta_i)/(\sin\theta_r)=\lambda_1/\lambda_2=v_1/v_2$ $\sin\theta_c=1/n \quad v=v\lambda$ $I=P/A \quad I=k/d^2 \quad E_2-E_1=hf \quad E=hf$	
4	Electricity: charge; ac/dc; peak/rms etc., current, resistance, voltage (potential difference), power calculations in series and parallel, potential dividers	$V_{\text{peak}}= \sqrt{2} V_{\text{rms}} \quad I_{\text{peak}}= \sqrt{2} I_{\text{rms}} \quad T=1/f \quad V=IR$ $Q=It, V=IR, V_2=(R_2/R_1+R_2)V_s,$ $V_1/V_2=R_1/R_2, P=IV, P=I^2R, P=V^2/R,$ $P=E/t, R_t=R_1+R_2+\dots \quad 1/R_t=1/R_1+1/R_2+\dots$	
5	EMF and internal resistance; Capacitors	$E=V+Ir$ $C=Q/V, Q=It$ $E=1/2CV^2=1/2QV=1/2Q^2/C$	
6	Semiconductors, band gaps, doping, p-n junctions, LED, bias.		
7	Equations of motion, suvat, projectiles, s-t v-t a-t graphs, bouncing balls; force, energy, power, lifts, rockets, slopes, couplings, conservation of energy.	$s=vt, v^2=u^2+2as, v=u+at, s=ut+1/2at^2,$ $s=1/2(u+v)/t$ $W=mg, P=E/t, E_p=mgh, E_k=1/2mv^2,$ $F_s=mgsin\theta$	
8	Conservation of momentum, elastic/inelastic collisions, explosions, impulse, f-t graphs	$P=mv$ $Ft=mv-mu$	
9	Gravitation, satellites as projectiles, mass, special relativity	$F=Gm_1m_2/r^2$	
10	Doppler effect, redshift, Hubble's law, galaxy recession, evidence, dark matter, dark energy, temperature vs wavelength of stars, cosmology, big bang, CMB.	$t'=t/\sqrt{1-(v/c)^2}$ $l'=l \times \sqrt{1-(v/c)^2}$ $f=f_s(v/(v\pm v_s))$ $v=H_0d$	