CIE IGCSE Physics Formula Sheet (2026, 2027 and 2028 Syllabus)

Updated for the 2026 - 2028 Syllabus Cycle

Chapter 1: General Physics	
$\text{Average speed (ms}^{-1}\text{)} = \dfrac{\text{distance (m)}}{\text{time (s)}}$	$s = \dfrac{d}{t}$
$\text{Average velocity (ms}^{-1}\text{)} = \dfrac{\text{displacement (m)}}{\text{time (s)}}$	$v = \dfrac{x}{t}$
$\text{Acceleration (ms}^{-2}\text{)} = \dfrac{\text{final velocity (ms}^{-1}\text{)} - \text{initial velocity(ms}^{-1}\text{)}}{\text{time (s)}}$	$a = \dfrac{v-u}{t}$
Weight (N) = mass (kg) × gravitational field strength (ms^{-2}) Earth's gravitational field strength = 9.8 ms^{-2} (as of 2023)	$W = mg$
Force (N) = mass (kg) × acceleration (ms^{-2})	$F = ma$
$\text{Density (kgm}^{-3}\text{)} = \dfrac{\text{mass (kg)}}{\text{volume}^{\ 3}}$	$\rho = \dfrac{m}{V}$
Hooke's law: Force (N) = constant (Nm^{-1}) × extension (m)	$F = kx$
$\text{Pressure(Pa)} = \dfrac{\text{Force (N)}}{\text{area (m}^2\text{)}}$	$P = \dfrac{F}{A}$
Fluid Pressure (Pa) = density (kgm^{-3}) × gravitational field strength (ms^{-2} or Nkg^{-1}) × height (m)	$P = \rho gh$
Work (J) = force (N) × distance moved (m)	$W = Fd$
$\text{Power (W)} = \dfrac{\text{work (J)}}{\text{time (s)}}$	$P = \dfrac{W}{t}$
Kinetic Energy (J) = ½ × mass (kg) × velocity^2 (ms^{-1})	$KE = \frac{1}{2}mv^2$
Gravitational potential energy (J) = mass (kg) × gravitational field strength (ms^{-2} or Nkg^{-1}) × height (m)	$GPE = mgh$
Elastic potential energy (Joules) = 0.5 × spring constant (Nm^{-1}) × change in length $(x)^2$	$EPE = \frac{1}{2}kx^2$
$\text{Efficiency (\%)} = \dfrac{\text{useful power output (W or J)}}{\text{total power input (W or J)}} \times 100\%$	$\eta = \dfrac{P_{out}}{P_{in}} \times 100\%$
Moment (Nm) = Force (N) × perpendicular distance from pivot (m)	$M = Fd$
Sum of clockwise moments (Nm) = sum of anticlockwise moments (Nm)	$F_1d_1 = F_2d_2$
Momentum ($kgms^{-1}$) = mass (kg) × velocity (ms^{-1})	$p = mv$
$\text{Impulsive Force (N)} = \dfrac{\text{change in momentum (kgms}^{-1}\text{)}}{\text{time (s)}}$	$F = \dfrac{\Delta p}{t}$
Impulse ($kgms^{-1}$ or Ns) = change in momentum ($kgms^{-1}$)	$\Delta p = mv - mu$
Chapter 2: Thermal Physics	
Boyle's Law for changes in gas pressure at constant temperature : pressure$_1$ (Pa) × volume$_1$ (m^3) = pressure$_2$ (Pa)× volume$_2$ (m^3)	$P_1V_1 = P_2V_2$
Energy (J) = mass (kg) × specific heat capacity ($Jkg^{-1}°C^{-1}$) × temperature change (°C)	$Q = mc\theta$
Celsius to Kelvin: Temperature in Celsius (°C) = Temperature in Kelvin (K) - 273.15	$C = K - 273.15$
Chapter 3: Waves	
Wave speed (ms^{-1}) = frequency (Hz) × wavelength (m)	$V = f\lambda$
$\text{Frequency (Hz)} = \dfrac{1}{\text{Period (s)}}$	$f = \dfrac{1}{T}$
$\text{Refractive index} = \dfrac{\text{sine of the angle of incidence, i}}{\text{sine of the angle of refraction, r}}$	$n = \dfrac{\sin i}{\sin r}$
$\text{Refractive index} = \dfrac{\text{speed of light in vacuum}}{\text{speed of light in material}}$	$n = \dfrac{c}{v}$
$\text{Refractive index} = \dfrac{1}{\text{sine of critical angle}}$	$n = \dfrac{1}{\sin c}$

Chapter 4: Electricity and Magnetism	
Current (A) $= \frac{\text{charge (C)}}{\text{time (s)}}$	$I = \frac{Q}{t}$
Voltage (V) $= \frac{\text{energy transferred (J)}}{\text{charge (C)}}$	$V = \frac{W}{Q}$
Voltage (V) = current (A) × resistance (Ω)	$V = IR$
Power (W) = current (A) × voltage (V)	$P = IV$
Power (W) = current² (A) × resistance (Ω)	$P = I^2R$
Energy transferred (J) = current (A) × voltage (V) × time (s)	$W = IVt$
Energy transferred (J) = power (W) × time (s)	$W = Pt$
Resistors in series: Total Resistance (Ω) = sum of individual resistors (Ω)	$R_{total} = R_1 + R_2 + R_3 + ...R_n$
Resistors in parallel: $\frac{1}{\text{total resistance }(\Omega)} = \frac{1}{\text{sum of individual resistors }(\Omega)}$	$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + ...\frac{1}{R_n}$
Resistance (Ω) $= \frac{\text{resistivity }(\Omega\text{m}) \times \text{ length (m)}}{area(\text{m}^2)}$ Wires have a circular cross section, area = π × radius²	$R = \frac{\rho\, l}{A}$
Transformers: $\frac{\text{voltage in secondary coil (V)}}{\text{voltage in primary coil (V)}} = \frac{\text{turns on secondary coil}}{\text{turns on primary coil}}$	$\frac{V_s}{V_p} = \frac{N_s}{N_p}$
Transformers: $\frac{\text{voltage in secondary coil (V)}}{\text{voltage in primary coil (V)}} = \frac{\text{current in primary coil (A)}}{\text{current in secondary coil (A)}}$	$\frac{V_s}{V_p} = \frac{I_P}{I_s}$
Chapter 5: Nuclear Physics	
Alpha: $^{238}_{92}U \rightarrow {}^{234}_{90}Th + {}^{4}_{2}He$	$^{A}_{Z}X \rightarrow {}^{A-4}_{Z-2}Y + {}^{4}_{2}He$
Beta: $^{234}_{90}Th \rightarrow {}^{234}_{91}Pa + {}^{0}_{-1}e$	$^{A}_{Z}X \rightarrow {}_{Z+1}^{A}Y + {}^{0}_{-1}e$
Gamma	$^{A}_{Z}X \rightarrow {}^{A}_{Z}Y + \gamma$
Chapter 6: Space Physics	
$Average\ orbital\ speed\ (\text{ms}^{-1}) = \frac{2 \times \pi \times \text{average radius of the orbit (m)}}{\text{orbital period (s)}}$	$v = \frac{2\pi r}{T}$
$\frac{\text{distance of a far galaxy (m)}}{\text{speed away from us }(\text{m}s^{-1})} = \frac{1}{\text{Hubble Constant }(s^{-1})}$ Hubble Constant is $2.2 \times 10^{-18}\ \text{s}^{-1}$	$\frac{d}{v} = \frac{1}{H_0}$