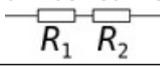
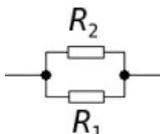


iGCSE CIE Physics 0625 (2020 Syllabus) Formula List

General	
Average speed (ms^{-1}) = $\frac{\text{distance (m)}}{\text{time (s)}}$	
Average velocity (ms^{-1}) = $\frac{\text{displacement (m)}}{\text{time (s)}}$	$v = \frac{s}{t}$
Period of a pendulum (s) = $\frac{\text{total time (s)}}{\text{number of swings}}$	$T = \frac{t}{\text{number}}$
Acceleration (ms^{-2}) = $\frac{\text{final velocity (ms}^{-1}) - \text{initial velocity (ms}^{-1})}{\text{time (s)}}$	$a = \frac{v-u}{t}$
Weight (N) = mass (kg) × gravitational field strength (ms^{-2}) Note: Earth's gravitational field strength = $10 ms^{-2}$	$F = mg$
Force (N) = mass (kg) × acceleration (ms^{-2})	$F = ma$
Density (kgm^{-3}) = $\frac{\text{mass (kg)}}{\text{volume (m}^3)}$	$\rho = \frac{M}{V}$
Hooke's law: Force (N) = constant (Nm^{-1}) × extension (m)	$F = kx$
Pressure (Pa) = $\frac{\text{force (N)}}{\text{area (m}^2)}$	$P = \frac{F}{A}$
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)	$\Delta E = Fd$
Power (W) = $\frac{\text{work (J)}}{\text{time (s)}}$	$P = \frac{\Delta E}{t}$
Kinetic Energy (J) = $\frac{1}{2} \times \text{mass (kg)} \times \text{velocity}^2 (ms^{-1})$	$KE = \frac{1}{2}mv^2$
Gravitational potential energy (J) = mass (kg) × gravitational field strength (ms^{-2} or Nkg^{-1}) × height (m)	$GPE = mgh$
Efficiency (%) = $\frac{\text{useful power output (W)} \times 100}{\text{total power input (W)}}$	Efficiency = $\frac{P_{out}}{P_{in}}$
Efficiency (%) = $\frac{\text{useful energy output (J)} \times 100}{\text{total energy input (J)}}$	Efficiency = $\frac{E_{out}}{E_{in}}$
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})	$p = mv$
Force (N) = $\frac{\text{change in momentum (kgms}^{-1})}{\text{time (s)}}$	$F = \frac{\Delta p}{t}$
Impulse ($kgms^{-1}$ or Ns) = change in momentum ($kgms^{-1}$)	$Ft = mv - mu$
Centripetal Force (N) = $\frac{\text{mass (kg)} \times \text{velocity}^2 (ms^{-1})}{\text{radius (m)}}$	$F = \frac{mv^2}{r}$
Orbital Period (s) = $\frac{2 \times \pi \times \text{radius (m)}}{\text{velocity (ms}^{-1})}$	$T = \frac{2\pi r}{v}$
Thermal	
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) or pressure (Pa) × volume (m ³) = constant	$P_1V_1 = P_2V_2$ or $PV = \text{constant}$
Energy (J) = mass (kg) × specific heat capacity ($Jkg^{-1}^{\circ}C^{-1}$) × temperature change ($^{\circ}C$)	$E = mc\Delta T$
Thermal capacity ($J^{\circ}C^{-1}$) = mass (kg) × specific heat capacity ($Jkg^{-1}^{\circ}C^{-1}$)	$C = mc$
Energy transferred (J) = mass (kg) × specific latent heat (Jkg^{-1})	$E = ml$
Expansion (m) = linear expansivity ($^{\circ}C^{-1}$) × original length (m) × temperature rise ($^{\circ}C$)	Expansion = $\alpha l \Delta T$

Electricity	
Current (A) = $\frac{\text{charge (C)}}{\text{time (s)}}$	$I = \frac{Q}{t}$
Voltage (V) = $\frac{\text{energy transferred (J)}}{\text{charge (C)}}$	$V = \frac{E}{Q}$
Voltage (V) = current (A) × resistance (Ω)	$V = IR$
Power (W) = current (A) × voltage (V)	$P = IV$
Power (W) = current ² (A) × resistance (Ω)	$P = I^2R$
Energy transferred (J) = current (A) × voltage (V) × time (s)	$\Delta E = IVt$
Energy transferred (J) = power (W) × time (s)	$\Delta E = Pt$
Resistors in series: Total Resistance (Ω) = sum of individual resistors (Ω) 	$R_{\text{TOTAL}} = R_1 + R_2 + R_3 + \dots + R_n$
Resistors in parallel: $\frac{1}{\text{total resistance (}\Omega\text{)}} = \frac{1}{\text{sum of individual resistors (}\Omega\text{)}}$ 	$\frac{1}{R_{\text{TOTAL}}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots + \frac{1}{R_n}$
Resistance (Ω) = $\frac{\text{resistivity (}\Omega\text{m)} \times \text{length (m)}}{\text{area (m}^2\text{)}}$ <i>Note: since wires have a circular cross section, area = π × radius²</i>	$R = \frac{\rho l}{A}$
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: $\frac{\text{voltage in primary coil (V)}}{\text{voltage in secondary coil (V)}} = \frac{\text{current in secondary coil (A)}}{\text{current in primary coil (A)}}$	$\frac{V_p}{V_s} = \frac{I_s}{I_p}$
Waves	
Wave speed (ms ⁻¹) = frequency (Hz) × wavelength (m)	$c = f\lambda$
Frequency (Hz) = $\frac{1}{\text{Period (s)}}$	$F = \frac{1}{T}$
Refractive index = $\frac{\text{sine of the angle of incidence, } i}{\text{sine of the angle of refraction, } r}$	$n = \frac{\sin i}{\sin r}$
Refractive index = $\frac{\text{speed of light in vacuum}}{\text{speed of light in material}}$	$n = \frac{c_v}{c_m}$
Refractive index = $\frac{1}{\text{sine of critical angle}}$	$n = \frac{1}{\text{sinc}}$
Nuclear	
Radioactive alpha decay: ${}_{92}^{238}\text{Th} \rightarrow {}_{90}^{234}\text{U} + {}_2^4\text{He} + \text{energy}$	${}_Z^A X \rightarrow {}_{Z-2}^{A-4} Y + {}_2^4 \text{He}$
Radioactive beta decay: ${}_{82}^{209}\text{Pb} \rightarrow {}_{83}^{209}\text{Bi} + {}_{-1}^0\text{e} + \text{energy}$	${}_Z^A X \rightarrow {}_{Z+1}^A Y + {}_{-1}^0 \text{e}$
Radioactive gamma decay: ${}_{27}^{60}\text{Co} \rightarrow {}_{27}^{60}\text{Co} + \gamma + \text{energy}$	${}_Z^A X \rightarrow {}_Z^A Y + \gamma$
Energy (J) = mass defect (kg) × speed of light ² (ms ⁻¹)	$E = mc^2$

Space Physics

Average orbital speed = $(2 \times \pi \times \text{radius}) / \text{time}$