Edexcel iGCSE Physics Equation Sheet

ALL symbols and units must be learnt – none are given in the exam.

Topic 1 – Forces and Motion

Equations to learn	Symbols	Units
$d = s \times t$	d = distance s = speed t = time	d = m (meters) s = m/s (meters per second) t = s (seconds)
$a = \frac{v - u}{t}$	a = acceleration v = final velocity u = initial velocity t = time	a = m/s^2 (meters per second squared) v = m/s (meters per second) u = m/s (meters per second) t = s (seconds)
$F = m \times a$	F = force m = mass a = acceleration	F = N (newtons) m = kg (kilograms) a = m/s^2 (meters per second squared)
$W = m \times g$	W = weight m = mass g = gravitational field strength	W = N (newton's) m = kg (kilograms) g = N/kg (newtons per kilogram)
$p = m \times v$ **Paper 2 only**	p = momentum m = mass v = velocity	p = kg m/s (kilograms metre per second) m = kg (kilograms) v = m/s (meters per second)
$M = F \times d$ **Paper 2 only**	M = moment F = force d = Perpendicular distance	M = Nm (newton-meters) F = N (newtons) d = m (meters)
Equations to find on the formula sheet and use	**Symbols**	**Units**
$v^2 - u^2 = 2as$	v = final velocity u = initial velocity a = acceleration s = distance	v = m/s (meters per second) u = m/s (meters per second) a = m/s^2 (meters per second squared) s = m (meters)
$F = \frac{(mv - mu)}{T}$ **Paper 2 only**	F = force mv = final momentum mu = initial momentum t = time	F = N (newtons) mv = kgm/s (kilogram metre per second) mu = kgm/s (kilogram metre per second) t = s (seconds)

Topic 2 – Electricity

Equations to learn	Symbols	Units
$P = V \times I$	P = Power V = Potential difference I = Current	P = W (watts) V = V (volts) I = A (amps)
$V = I \times R$	V = Potential difference I = Current R = Resistance	V = V (volts) I = A (amps) R = Ω (ohms)
$Q = I \times t$	Q = Charge I = Current t = Time	Q = C (coulombs) I = A (amps) t = s (seconds)
$E = Q \times V$	E = Energy Q = Charge V = Potential difference	E = J (joules) Q = C (coulombs) V = V (volts)
Equations to find on the formula sheet and use	**Symbols**	**Units**
$E = I \times V \times t$	E = Energy I = Current V = Potential difference t = Time	E = J (joules) I = A (amps) V = V (volts) t = s (seconds)

Topic 3 – Waves

Equations to learn	Symbols	Units
$v = f \times \lambda$	v = velocity f = frequency λ = wavelength (lambda)	v = m/s (meters per second) f = Hz (hertz) λ = m (meters)
$n = \frac{\sin i}{\sin r}$	n = refractive index i = angle of incidence r = angle of refraction	n = (there is no unit for this, but the number should be somewhere around a decimal point of 1 or 2) i = ° (degrees) r = ° (degrees)
$\sin c = \frac{1}{n}$	c = critical angle n = refractive index	c = ° (degrees) n = (there is no unit for this, but the number should be somewhere around a decimal point of 1 or 2)
Equations to find on the formula sheet and use	**Symbols**	**Units**
Frequency = $\frac{1}{\text{Time period}}$	**T = time period**	Frequency = Hz (hertz) Period = s (seconds)

Topic 4 – Energy Resources and Energy Transfer

Equations to learn	Symbols	Units
Efficiency = $\frac{\text{useful energy out}}{\text{total energy in}}$ x 100		
W = F x d	W = work done F = force d = distance	W = J (joules) F = N (newtons) d = m (meters)
GPE = m x g x h	GPE = gravitational potential energy m = mass g = gravitational field strength h = height	GPE = J (joules) m = kg (kilograms) g = N/kg (newtons per kilogram) h = m (meters)
KE = ½ mv^2	KE = kinetic energy m = mass v = speed	KE = J (joules) m = kg (kilograms) v = m/s (meters per second)
Remember: Energy transferred = work done = kinetic energy = gravitational potential energy *In the same system*		
Equations to find on the formula sheet and use	**Symbols**	**Units**
P = $\frac{W}{t}$	P = power W = work done t = time taken	P = W (watts) E = J (joules) t = s (seconds)

Topic 5 – Solids, liquids and gases

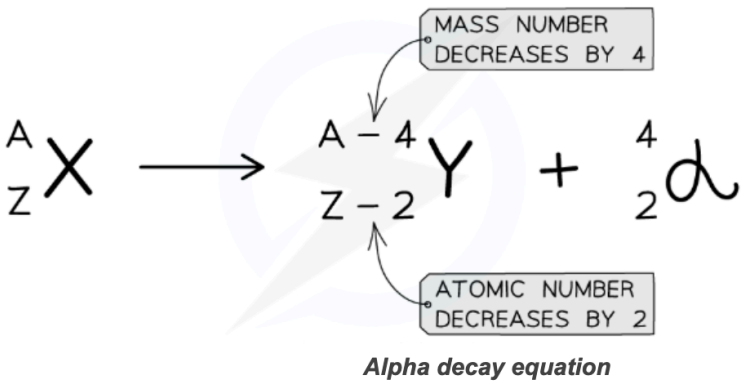
Equations to learn	Symbols	Units
$\rho = \frac{m}{V}$	ρ = density m = mass V = volume	ρ = kg/m^3 (kilograms per meter cubed m = kg (kilograms) V = m^3 (meters cubed)
P = $\frac{F}{A}$	P = pressure F = force A = area	P = Pa (pascals) F = N (newtons) A = m^2 (meters squared)
p = h x ρ x g	p = pressure h = height ρ = density g = gravitational field strength	p = Pa (pascals) h = m (meters) ρ = kg/m^3 (kilograms per meter cubed g = N/kg (newtons per kilogram)
Equations to find on the formula sheet and use	**Symbols**	**Units**
ΔQ = m x c x ΔT **Paper 2 only**	ΔQ = change in thermal energy m = mass c = specific heat capacity ΔT = temperature change	ΔQ = J (joules) m = kg (kilograms) c = J/kg°C (joules per kilogram degree Celsius) ΔT = °C (degree Celsius)

PV = constant This is what will be written on the formula sheet. What you need to learn is this: $P_1 \times V_1 = P_2 \times V_2$	p = pressure V = volume	p = Pa (pascals) V = m^3 (meters cubed)
PT = constant This is what will be written on the formula sheet. What you need to learn is this: $\frac{P_1}{T_1} = \frac{P_2}{T_2}$	P = pressure T = temperature	P = Pa (pascals) T = ° (degrees Celcius)

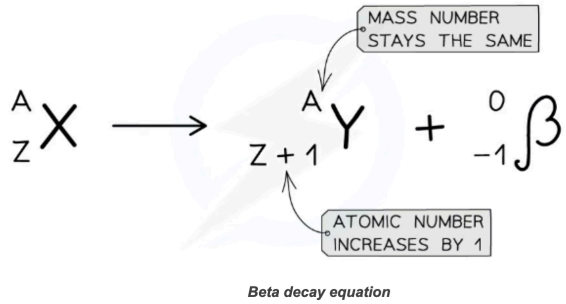
Topic 6 – Magnetism and electromagnetism

Equations to learn	Symbols	Units
$\frac{V_p}{V_s} = \frac{n_p}{n_s}$ **Paper 2 only**	V_p = potential difference across the primary coil V_s = potential difference across the secondary coil n_p = number of turns on the primary coil n_s = number of turns on the secondary coil	V_p = V (volts) V_s = V (volts) n_p and n_s have no units as they are just numbers
$V_p I_p = V_s I_s$ **Paper 2 only**	V_p = potential difference across the primary coil V_s = potential difference across the secondary coil I_p = current in the primary coil I_s = current in the secondary coil $V_p I_p$ = power input $V_s I_s$ = power output	V_p = V (volts) V_s = V (volts) I_p = A (Amps or Amperes) I_s = A (Amps or Amperes)

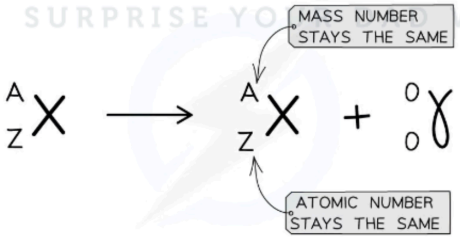
There are no equations for topic 7. **(Radioactivity and particles)**



Alpha decay equation



Beta decay equation



Gamma decay equation

Topic 8 – Astrophysics

Equations to find on the formula sheet and use	Symbols	Units
$v = \frac{2 \times \pi \times r}{T}$	v = orbital speed r = orbital radius T = time period	v = km/s or m/s (kilometres per second or meters per second) r = km or m (kilometres or meters) T = s (seconds)
$\frac{\lambda - \lambda_0}{\lambda_0} = \frac{\Delta\lambda}{\lambda_0} = \frac{v}{c}$ **Paper 2 only**	Δλ = change in wavelength λ_0 = reference wavelength v = velocity of a galaxy c = speed of light	Δλ = km or m (kilometres or meters) λ_0 = km or m (kilometres or meters) v = m/s (meters per second) c = m/s (meters per second)