Physics equations to memorise

Exam	Word equation	Symbol equation	SI unit
Paper 1	kinetic energy = 0.5 × mass × (speed)^2	$E_k = ½ m v^2$	Kinetic energy = Joules (J) Mass = kilograms (kg) Speed = metres per second (m/s)
Paper 1	gravitational potential energy = mass × gravitational field strength × height	$E_p = m g h$	E_p = Joules (J) Mass = kilograms (kg) g = Newtons per kilogram (N/kg) Height = metres (m)
Paper 1	power = $\frac{\text{energy transferred}}{\text{time}}$	$P = E/t$	Power = Watts (W) Energy = Joules (J) Time = seconds (s)
Paper 1	power = $\frac{\text{work done}}{\text{time}}$	$P = W/t$	Power = Watts (W) Work done = Joules (J) Time = seconds (s)
Paper 1	efficiency = $\frac{\text{useful output energy transfer}}{\text{total input energy transfer}}$		
Paper 1	efficiency = $\frac{\text{useful power output}}{\text{total power input}}$		
Paper 1	charge flow = current × time	$Q = I t$	Charge flow = Coulombs (C) Current = Amperes (A) Time = seconds (s)
Paper 1	potential difference = current × resistance	$V = I R$	Potential difference = Volts (V) Current = Amperes (A) Resistance = Ohms (Ω)
Paper 1	power = potential difference × current	$P = V I$	Power = Watts (W) Potential difference = Volts (V) Current = Amperes (A)
Paper 1	power = (current)^2 × resistance	$P = I^2 R$	Power = Watts (W) Current = Amperes (A) Resistance = Ohms (Ω)
Paper 1	energy transferred = power × time	$E = P t$	Energy = Joules (J) Power = Watts (W) Time = seconds (s)

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Paper 1	energy transferred = charge flow × potential difference	$E = Q\ V$	Energy = Joules (J) Charge flow = Coulombs (C) Potential difference = Volts (V)
Paper 1	density = $\frac{\text{mass}}{\text{volume}}$	$\rho = m / V$	Density = kilograms per metre cubed (kg/m^3) Mass = kilograms (kg) Volume = metres cubed (m^3)
Paper 2	weight = mass × gravitational field strength (g)	$W = m\ g$	Weight = Newtons (N) Mass = kilograms (kg) g = Newtons per kilogram (N/kg)
Paper 2	work done = force × distance (along the line of action of the force)	$W = F\ s$	Work done = Joules (J) Force = Newtons (N) Distance = metres (m)
Paper 2	force applied to a spring = spring constant × extension	$F = k\ e$	Force = Newtons (N) Spring constant = Newtons per metre (N/m) Extension = metres (m)
Paper 2 TRIPLE ONLY	**moment of a force = force × distance (normal to direction of force)**	$\boldsymbol{M = F\ d}$	**Moment = Newton-metres (Nm)** **Force = Newtons (N)** **Distance = metres (m)**
Paper 2 TRIPLE ONLY	**pressure = $\frac{\text{force normal to a surface}}{\text{area of that surface}}$**	$\boldsymbol{p = F/A}$	**Pressure = Pascals (Pa)** **Force = Newtons (N)** **Area = metres squared (m^2)**
Paper 2	distance travelled = speed × time	$s = v\ t$	Distance = metres (m) Speed = metres per second (m/s) Time = seconds (s)
Paper 2	acceleration = $\frac{\text{change in velocity}}{\text{time taken}}$	$a = \Delta v/t$	Acceleration = metres per second squared (m/s^2) Velocity = metres per second (m/s) Time = seconds (s)
Paper 2	resultant force = mass × acceleration	$F = m\ a$	Force = Newtons (N) Mass = kilograms (kg) Acceleration = metres per second squared (m/s^2)
Paper 2 - (HT)	momentum = mass × velocity	$p = m\ v$	Momentum = kilogram metres per second (kg m/s) Mass = kilograms (kg) Velocity = metres per second (m/s)
Paper 2	wave speed = frequency × wavelength	$v = f\ \lambda$	Wave speed = metres per second (m/s) Frequency = Hertz (Hz) Wavelength = metres (m)