Paper 1 Physics Equations to Remember – you have to learn and remember these equations

GCSE Physics (8463) **(HT)** GCSE Combined Science: Trilogy (8464) **(HT)**

Energy Topic

#	Written Form	Formula	Units
1	kinetic energy = ½ × mass × (velocity)^2	$[E_k = \frac{1}{2}mv^2]$	E_k Joules (J) m kilograms (kg) v metres per second (m/s)
2	Gravitational Potential Energy = mass × gravitational field strength × height	$[E_p = mgh]$	E_p Joules (J) m kilograms (kg) g Newtons per kilogram (N/kg) h metres (m)
3	power = energy transferred ÷ time	$[P = E/t]$	P Watts (W) E Joules (J) t seconds (s)
4	power = work done ÷ time	$[P = W/t]$	P Watts (W) W Joules (J) t seconds (s)
5	energy transferred = power × time	$E = Pt$	E Joules (J) P Watts (W) t seconds (s)
6	$Efficiency = \frac{Useful\ Energy\ Out}{Total\ Energy\ In} (\times 100\%)$		
7	$Efficiency = \frac{Useful\ Power\ Out}{Total\ Power\ In} (\times 100\%)$		

Electricity Topic

#	Written Form	Formula	Units
1	Charge = Current × Time	$[Q = It]$	Q Coulombs (C) I Amps (A) t seconds (s)
2	Potential Difference = Current × Resistance	$[V = IR]$	V Volts (V) I Amps (A) R Ohms (Ω)
3	Total Resistance in Series = Sum of all Resistors	$[R_{total} = R_1 + R_2]$	$R_{(all)}$ Ohms (Ω)
4	Power = Potential Difference × Current	$[P = VI]$	P Watts (W) V Volts (V) I Amps (A)
5	Power = (Current)^2 × Resistance	$[P = I^2 R]$	P Watts (W) I Amps (A) R Ohms (Ω)
6	Energy Transferred = Power × Time	$[E = Pt]$	E Joules (J) P Watts (W) t seconds (s)
7	Energy Transferred = Charge × Potential Difference	$[E = QV]$	E Joules (J) Q Coulombs (C) V Volts (V)

Particles Topic

#	Written Form	Formula	Units
1	Density = Mass ÷ Volume	[ρ = m/V]	ρ kilograms per cubic metre (kg/m^3) m kilograms (kg) *V* cubic metres (m^3)

Atomic Structure Topic

No specific equations for this topic but you will be expected to be able to calculate the age of material from its half-life and current radioactivity.

Equations that are Provided – you don't have to remember these, but must be able to use them

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Energy Topic

#	Written Form	Formula	Units
1	elastic potential energy = 0.5 × spring constant × (extension)^2	*[$E_e = ½ke^2$]*	E_e Joules (J) k Newtons per metre (N/m) e extension (m)
2	change in thermal energy = mass × specific heat capacity × temperature change	*[$\Delta E = mc\Delta\theta$]*	ΔE Joules (J) m kilograms (kg) c Joules per kilogram per degree Celsius (J/kg°C) $\Delta\theta$ degrees Celsius (°C)

Electricity Topic

There are no equations provided for this topic.

Particles Topic

#	Written Form	Formula	Units
1	change in thermal energy = mass × specific heat capacity × temperature change	*[$\Delta E = m\ c\ \Delta\theta$]*	ΔE Joules (J) m kilograms (kg) c Joules per kilogram per degree Celsius (J/kg°C) $\Delta\theta$ degrees Celsius (°C)
2	thermal energy for a change of state = mass × specific latent heat	*[$E = mL$]*	E Joules (J) m kilograms (kg) L Joules per kilogram (J/kg)
3	For gases: pressure × volume = constant	***[pV = constant]***	***p*** Pascals (Pa) ***V*** cubic metres (m^3)

Atomic Structure Topic

There are no equations provided for this topic.