AQA GCSE Physics Equation Sheet

Topic 1 - Energy

Equation	Symbol	Unit
$E_k = \frac{1}{2} mv^2$	E_k = kinetic energy m = mass v = speed	E_k = J (joules) m = kg (kilograms) v = m/s (meters per second)
$E_e = \frac{1}{2} ke^2$	E_e = elastic potential energy k = spring constant e = extension	E_e = J (joules) k = N/m (newton's per meter) e = m (meters)
$E_p = mgh$	E_p = gravitational potential energy m = mass g = gravitational field strength h = height	E_p = J (joules) m = kg (kilograms) g = N/kg (newton's per kilogram) h = m (meters)
$\Delta E = mc\Delta\theta$	ΔE = change in thermal energy m = mass c = specific heat capacity $\Delta\theta$ = temperature change	ΔE = J (joules) m = kg (kilograms) c = J/kg°C (joules per kilogram per degree Celsius) $\Delta\theta$ = °C (degree Celsius)
$P = \frac{E}{t}$	P = power E = energy transferred t = time	P = W (watts) E = J (joules) t = s (seconds)
$P = \frac{W}{t}$	P = power W = work done t = time	P = W (watts) E = J (joules) t = s (seconds)
$\text{Efficiency} = \frac{\text{useful energy out}}{\text{total energy in}}$		
$\text{Efficiency} = \frac{\text{useful power out}}{\text{total power in}}$		

Topic 2 – Electricity

Equation	Symbols	Units
$Q = It$	Q = Charge I = Current t = Time	Q = C (coulombs) I = A (amps) t = s (seconds)
$V = IR$	V = Potential difference I = Current R = Resistance	V = V (volts) I = A (amps) R = Ω (ohms)
$P = VI$	P = Power V = Potential difference I = Current	P = W (watts) V = V (volts) I = A (amps)
$P = I^2R$	P = Power I = Current R = Resistance	P = W (watts) I = A (amps) R = Ω (ohms)
$E = Pt$	E = Energy P = Power t = Time	E = J (joules) P = W (watts) t = s (seconds)
$E = QV$	E = Energy Q = Charge V = Potential difference	E = J (joules) Q = C (coulombs) V = V (volts)

Topic 3 – Particle Model of Matter

Equation	Symbols	Units
$\rho = \frac{m}{V}$	ρ = density m = mass V = volume	ρ = kg/m^3 (kilgorams per meter cubed m = kg (kilograms) V = m^3 (meters cubed)
$\Delta E = mc\Delta\theta$	ΔE = change in thermal energy m = mass c = specific heat capacity Δθ = temperature change	ΔE = J (joules) m = kg (kilograms) c = J/kg°C (joules per kilogram per degree Celsius) Δθ = °C (degree Celsius)
$E = mL$	E = Energy m = mass L = specific latent heat	E = J (joules) m = kg (kilograms) L = J/kg (joules per kilogram)
$pV = \text{constant}$	p = pressure V = volume	p = Pa (pascals) V = m^3 (meters cubed)

Topic 5 – Forces

Equation	Symbols	Units
$W = mg$	W = weight m = mass g = gravitational field strength	W = N (newton's) m = kg (kilograms) g = N/kg (newton's per kilogram)
$W = Fs$	W = work done F = force s = distance	W = J (joules) F = N (newtons) s = m (meters)
$F = ke$	F = force k = spring constant e = extension	F = N (newtons) k = N/m (newtons per meter) e = m (meters)
$E_e = \frac{1}{2} ke^2$	E_e = elastic potential energy k = spring constant e = extension	E_e = J (joules) k = N/m (newtons per meter) e = m (meters)
$M = Fd$	M = moment F = force d = distance	M = Nm (newton-meters) F = N (newtons) d = m (meters)
$p = \frac{F}{A}$	p = pressure F = force A = area	p = Pa (pascals) F = N (newtons) A = m^2 (meters squared)
$p = h\rho g$	p = pressure h = height ρ = density g = gravitational field strength	p = Pa (pascals) h = m (meters) ρ = kg/m^3 (kilgorams per meter cubed g = N/kg (newtons per kilogram)
$s = vt$	s = distance v = speed t = time	s = m (meters) v = m/s (meters per second) t = s (seconds)
$a = \frac{\Delta v}{t}$	a = acceleration Δv = change in velocity t = time	a = m/s^2 (meters per second squared) Δv = m/s (meters per second) t = s (seconds)
$v^2 - u^2 = 2as$	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)

$F = ma$	F = force m = mass a = acceleration	F = N (newtons) m = kg (kilograms) a = m/s^2 (meters per second squared)
$p = mv$	p = momentum m = mass v = velocity	p = kg m/s (kilograms metre per second) m = kg (kilograms) v = m/s (meters per second)
$F = \frac{m \Delta v}{\Delta t}$	F = force m = mass v = velocity t = time	F = N (newtons) m = kg (kilograms) v = m/s (meters per second) t = s (seconds)

Topic 6 – Waves

Equation	Symbols	Units
$\text{Period} = \frac{1}{\text{frequency}}$		Period = s (seconds) Frequency = Hz (herts)
$T = \frac{1}{f}$	T = Period f = frequency	T = s (seconds) f = Hz (herts)
$v = f\lambda$	v = velocity f = frequency ʎ = wavelength (lambda)	v = m/s (meters per second) f = Hz (herts) ʎ = m (meters)
$\text{Magnification} = \frac{\text{image height}}{\text{object height}}$		Ratio so has no units

Topic 7 – Magnetism and Electromagnetism

Equation	Symbols	Units
$F = BIl$ Note this is a capital I and a lowercase l	F = force B = magnetic flux density I = Current l = length	F = N (newtons) B = T (tesla) I = A (Amps or Amperes) l = m (meters)
$\frac{V_p}{V_s} = \frac{n_p}{n_s}$	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
$V_s I_s = V_p I_p$	V_s = potential difference across the secondary coil V_p = potential difference across the primary coil I_s = current in the secondary coil I_p = current in the primary coil $V_s I_s$ = power output $V_p I_p$ = power input	V_s = V (volts) V_p = V (volts) I_s = A (Amps or Amperes) I_p = A (Amps or Amperes)