A Level Physics 9702 formula sheet

Exams in 2025, 2026 and 2027 · From the official Cambridge syllabus · Paper 3 / 4 / 6 = only on that paper

Data given in the exam

Acceleration of free fall	$g = 9.81\ m\ s^{-2}$
Speed of light in free space	$c = 3.00 \times 10^{8}\ m\ s^{-1}$
Elementary charge	$e = 1.60 \times 10^{-19}\ C$
Unified atomic mass unit	$1\ u = 1.66 \times 10^{-27}\ kg$
Rest mass of proton / electron	$1.67 \times 10^{-27}\ kg$ / $9.11 \times 10^{-31}\ kg$
Avogadro constant	$N_A = 6.02 \times 10^{23}\ mol^{-1}$
Molar gas constant	$R = 8.31\ J\ K^{-1}\ mol^{-1}$
Boltzmann constant	$k = 1.38 \times 10^{-23}\ J\ K^{-1}$
Gravitational constant	$G = 6.67 \times 10^{-11}\ N\ m^2\ kg^{-2}$
Permittivity of free space	$\varepsilon_0 = 8.85 \times 10^{-12}\ F\ m^{-1}$
Planck constant	$h = 6.63 \times 10^{-34}\ J\ s$
Stefan–Boltzmann constant	$\sigma = 5.67 \times 10^{-8}\ W\ m^{-2}\ K^{-4}$

Formulae given in the exam

Uniformly accelerated motion	$s = ut + \frac{1}{2}at^2,\ v^2 = u^2 + 2as$
Hydrostatic pressure	$\Delta p = \rho g \Delta h$
Upthrust	$F = \rho g V$
Doppler effect (sound)	$f_o = f_s v \div (v \pm v_s)$
Electric current	$I = Anvq$
Resistors in series / parallel	$R = R_1 + R_2 + \ldots,\ 1/R = 1/R_1 + 1/R_2 + \ldots$
Gravitational potential Paper 4	$\varphi = -GM/r$
Gravitational potential energy Paper 4	$E_P = -GMm/r$
Pressure of an ideal gas Paper 4	$p = \frac{1}{3}(Nm/V)\langle c^2 \rangle$
Simple harmonic motion Paper 4	$a = -\omega^2 x,\ v = \pm\omega\sqrt{(x_0^2 - x^2)}$
Electric potential Paper 4	$V = Q \div 4\pi\varepsilon_0 r$
Capacitors in series / parallel Paper 4	$1/C = 1/C_1 + 1/C_2 + \ldots,\ C = C_1 + C_2 + \ldots$
Discharge of a capacitor Paper 4	$x = x_0 e^{-t/RC}$
Hall voltage Paper 4	$V_H = BI \div ntq$
Radioactive decay Paper 4	$x = x_0 e^{-\lambda t},\ \lambda = 0.693 \div t_{½}$
Stefan–Boltzmann law Paper 4	$L = 4\pi\sigma r^2 T^4$
Doppler redshift Paper 4	$\Delta\lambda/\lambda \approx \Delta f/f \approx v/c$

Not given: learn these (AS)

Uniformly accelerated motion	$v = u + at,\ s = \frac{1}{2}(u + v)t$
Force and momentum	$F = ma,\ p = mv,\ F = \Delta p/\Delta t$
Work, power, energy	$W = Fs,\ P = Fv,\ E_P = mgh,\ E_K = \frac{1}{2}mv^2$
Springs and materials	$F = kx,\ E_P = \frac{1}{2}kx^2$, Young modulus = stress ÷ strain
Waves	$v = f\lambda,\ I = I_0 \cos^2\theta$
Interference and diffraction	$\lambda = ax/D,\ d \sin\theta = n\lambda$
Electricity	$Q = It,\ V = IR,\ P = VI = I^2R,\ R = \rho L/A$

Not given: learn these (A Level)

Circular motion	$\omega = 2\pi/T$, $v = \omega r$, $F = mv^2/r = mr\omega^2$
Gravitation	$F = Gm_1m_2/r^2$, $g = GM/r^2$
Ideal gases	$pV = nRT = NkT$, mean KE $= (3/2)kT$
First law of thermodynamics	$\Delta U = q + W$, $W = p\Delta V$
Electric fields	$F = qE$, $E = V/d$, $F = Q_1Q_2 \div 4\pi\varepsilon_0 r^2$
Capacitance	$C = Q/V$, $W = \frac{1}{2}CV^2$, $\tau = RC$
Magnetic forces	$F = BIL\sin\theta$, $F = BQv\sin\theta$, $\Phi = BA$
Alternating current	$I_{rms} = I_0/\sqrt{2}$
Quantum physics	$E = hf$, $hf = \Phi + \frac{1}{2}mv^2_{max}$, $\lambda = h/p$
Nuclear physics	$E = mc^2$, $A = \lambda N$

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