Equations used in High School Physics

MECHANICS	Equations Used
Density	$\frac{mass\ (kg) or\ (g)}{volume\ (m3)\ or (cm3)}$
Relative Density	$\frac{1\ (\frac{g}{cm3})}{density\ (\frac{g}{cm3})}$
Graphing	$\frac{y1-y2}{x1-x2}$ OR $\frac{y2-y1}{x2-x1}$
Determination of resultant force via right angled forces	hypotenuse^2 = adjacent^2 + opposite^2
Force	Mass (kg) × gravity (N/kg)
Turning moment	Force (N) × Distance (m) (Force$_1$ × Distance$_1$) = (Force$_2$ × Distance$_2$) All upward forces = All downward forces
Hooke's Law	Force (N) = spring constant (N/m) × extension (m)
Average speed	$\frac{distance\ (m)}{time\ (s)}$
velocity	$\frac{displacement\ (m)}{time\ (s)}$
Acceleration	$\frac{change\ in\ velocity\ \left(\frac{m}{s}\right)}{change\ in\ time\ (s)}$

MECHANICS	Equations Used
Related equations to speed, velocity and acceleration s = distance (m) a = acceleration (m/s^2) u = initial velocity (m/s) v = final velocity (m/s) t = time (s)	$v = u + at$ $v^2 = u^2 + 2as$ $s = ut + (at^2/2)$ $s = ((u + v)t) \div 2$
Newton's second law of motion	Force (N) = mass (kg) × acceleration (m/s^2)
Momentum	mass (kg) × velocity (m/s) Equation used for collision questions: ($mass_1 \times velocity_1$) + ($mass_2 \times velocity_2$) = ($mass_1 + mass_2$) × final velocity change in momentum = Force (N) × time (s)
Work	Force (N) × distance (m)
Potential Energy	mass (kg) × gravity (N/kg) × Δheight (m)
Kinetic Energy	½ × mass (kg) × $velocity^2$
Power	$\frac{Energy\ (J)}{time\ (s)}$ * Where **Energy** = Force (N) × distance (m)

MECHANICS	Equations Used
Efficiency	$\frac{Output\ value}{Input\ value} \times 100$
Pressure 1 Pa = 1 Nm^{-2}	Pressure on surfaces = $\frac{Force}{Area}$ Pressure in liquids = height (m) × density (kg/m^3) × gravity (N/kg)

THERMAL PHYSICS AND KINETIC THEORY	**Equations Used**
Temperature	When converting: Degree Celcius to Kelvins = + 273 Kelvins to Degree Celcius = - 273
Gas Laws Where: P means pressure V means volume T means temperature	Charles' Law $\frac{V1}{T1} = \frac{V2}{T2}$ Boyle's Law $P_1V_1 = P_2V_2$ Pressure Law $\frac{P1}{T1} = \frac{P2}{T2}$ The gas equation $\frac{P1V1}{T1} = \frac{P2V2}{T2}$
Heat capacity	Heat capacity, C (J/K) = heat energy, E_H (J) ÷ Temperature change, Δθ (K)
Specific Heat Capacity, c	$c = \frac{heat\ energy\ (J)}{mass\ (kg) \times\ change\ in\ temperature\ (\Delta\theta)}$ c = Thermal capacity, C ÷ mass
Latent heat of fusion, l_f	l_f = E_H (J) ÷ mass (kg) OR l_f = (Power (J/s) × time (s)) ÷ mass (kg)
Latent heat of vaporization, l_v	l_v = E_H (J) ÷ mass (kg) OR l_v = (Power (J/s) × time (s)) ÷ mass (kg)
Various equations for heat energy, E_H	$E_{H\text{heat given out}} = E_{H\text{heat taken in}}$ E_H = Power (W of J/s) × time (s) E_H = mass (kg) × gravity (N/kg) × height (m) E_H = ½ × mass (kg) × velocity^2 (m/s)^2

Waves	Equations Used
Period, T	$\frac{1}{frequency\ \left(\frac{1}{s}\right)}$
wave speed, *v*	frequency $(\frac{1}{s})$ × wavelength (m) OR distance (m) ÷ time (s)
Refractive Index, *n*	$\frac{\sin i}{\sin r}$ OR $\frac{\text{speed of light in air,v1 } (\frac{\text{m}}{\text{s}})}{speed\ of\ light\ in\ material,v2\ (\frac{m}{s})}$ OR $\frac{\sin i}{\sin r} = \frac{v1}{v2}$
Critical angle, C	sin C = $\frac{1}{refractive\ index\ of\ boundary}$
Linear magnification, m	$\frac{height\ of\ image}{height\ of\ object}$ OR $\frac{image\ distance, v}{object\ distance, u}$
Lens formula Where *u* = object distance *v* = image distance *f* = focal length	$\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$

Electricity and Magnetism	Equations Used
Electric charge, Q (C)	Current (A) × time (s) OR $I \times t$
Voltage, V (V) Where E means energy transferred R means resistance	$V = E \div Q$ OR $V = I \times R$
Power, (W or J/s)	$P = I \times V$ OR $P = E \div t$
Resistance, R (Ω)	$R = V \div I$ Resistors in series $= R_1 + R_2 + R_3 \ldots$ Resistors in parallel $= \frac{1}{R1} + \frac{1}{R2} + \frac{1}{R3}$
The transformer equation Where V means voltage N means number of turns I means current P means power subscript ***s*** means secondary subscript ***p*** means primary	$\frac{Vs}{Vp} = \frac{Ns}{Np} = \frac{Ip}{Is}$ Ideal transformer equation $= V_sI_s = V_pI_p$ OR $P_{out} = P_{in}$

THE PHYSICS OF THE ATOM	Equations used
Mass number	Number of neutrons + Number of protons
Alpha decay	$^{A-4}_{Z-2}X$
Beta decay	$^{A}_{Z+1}X$
Gamme decay	$^{A}_{Z}X$
Energy, E (J) Where m means mass c means speed of light	$E = m \times c^2$