Formula

PHYSICAL QUANTITY	FORMULA	SYMBOLS AND UNITS
Equations of motion at constant acceleration	$\bar{v} = \frac{v+u}{2}$ $s = \left(\frac{v+u}{2}\right)t$ $v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$ 	$\bar{v}$ = average speed, m/s s = displacement, m v = final velocity, m/s u = initial velocity, m/s a = acceleration, m/s^2 t = time, s
Density	$\rho = \frac{m}{v}$	ρ = density, kg/m^3 m = mass, kg v = volume, m^3
Weight	$W = mg$	W = weight, N m = mass, kg g = acceleration due to gravity, m/s^2 or N/kg
Force	$F = ma$	F = force, N m = mass, kg a = acceleration, m/s^2
Moment of a force about a point	$\tau = Fd$	τ = moment of a force, Nm F = force, N d = perpendicular distance from pivot to the line of action of the force, m
Object in equilibrium	• sum of clockwise moments = sum of anti-clockwise moments about the same pivot • sum of upward forces = sum of downward forces	
Work done	$W = Fd$	W = work done, J F = force, N d = displacement, m
Kinetic energy	$K.E. = \frac{1}{2}mv^2$	$K.E.$ = kinetic energy, J m = mass, kg v = speed, m/s
Gravitational potential enery	$P.E. = mgh$	$P.E.$ = potential energy, J m = mass, kg g = acceleration due to gravity, m/s^2

		h = height of an object measured from a reference point
Efficiency	$E = \frac{\text{useful energy converted}}{\text{total input energy}} \times 100\ \%$ $= \frac{\text{output power}}{\text{input power}} \times 100\ \%$	
Power	$P = \frac{W}{t} = \frac{E}{t} = \frac{Q}{t}$	P = Power, W W = Work done or energy transferred, J t = time, s E = energy transferred/used, J Q = thermal energy transferred, J
Pressure	$P = \frac{F}{A}$	P = pressure, Pa or Nm^{-2} F = normal force, N A = area, m^2
Liquid pressure	$P = h\rho g$	P = pressure at depth h, Pa or N/m^2 ρ = density, kg/m^3 g = acceleration due to gravity, m/s^2
Boyle's Law	$P_1V_1 = P_2V_2$	P_1 = pressure of gas at state 1, Pa or cm Hg or atm P_2 = pressure of gas at state 2, Pa or cm Hg or atm V_1 = volume of a gas at state 1, m^3 or cm^3 V_2 = volume of a gas at state 1, m^3 or cm^3
Specific heat capacity	$Q = mc\theta$	Q = heat absorbed/released due to change of temperature, J m = mass, kg c = specific heat capacity, J/(kgK) θ = change in temperature, K
Specific latent heat of vaporization or fusion	$Q = ml$	Q = heat absorbed/released due to change of state, J m = mass, kg l = specific latent heat of fusion or vaporization, J/kg
Wave equation	$v = f\lambda$ $f = \frac{1}{T}$	v = wave speed, m/s f = frequency, Hz λ = wavelength, m T = period, s

Refractive index **Critical angle**	$n = \frac{\sin i}{\sin r}$ $n = \frac{c}{v}$ $\sin \hat{c} = \frac{1}{n}$	n = refractive index i = angle in air/vacuum r = angle in medium c = speed of light in vacuum, m/s v = speed of light in medium, m/s $\hat{c}$ = critical angle
Amount of charge **Ohm's Law** **Potential** **Emf** **Electrical power** **Electrical energy**	$Q = It$ $V = IR$ $V = \frac{W}{Q}$ $\xi = \frac{\text{total work done}}{Q}$ $P = VI$ $E = VIt = I^2 R = \frac{V^2}{R} t$	Q = charge, C t = time, s V = potential difference across two points, V I = current, A R = resistance, Ω W = work done between two points, J ξ = emf, V P = power, W E = electrical energy, J
Transformer equation	$\frac{N_p}{N_s} = \frac{V_p}{V_s} = \frac{I_s}{I_p}$	N_p = number of turns in the primary coil N_s = number of turns in the secondary coil V_p = voltage across primary coil, V V_s = voltage across secondary coil, V I_p = current in primary coil, A I_s = current in secondary coil, A