Linear Motion		
1	Speed and Velocity (m/s)	$v = \frac{d}{t}$
2	Acceleration (m/s^2)	$a = \frac{\Delta v}{t} = \frac{v_f - v_i}{t}$
The 4 Equations of Constant Acceleration		
3		$v_f = v_i + at$
4		$d = \frac{1}{2}(v_f + v_i)t$
5		$d = v_i t + \frac{1}{2}at^2$
6		$v_f^{\,2} = v_i^{\,2} + 2ad$
Force		
7	Net Force (N)	$\Sigma F = ma$
8	Frictional Force (N)	$F_f = \mu F_N$
9	Weight (N)	$F_g = mg$
10	Hooke's Law (N)	$F_S = kx$
Circular Motion & Gravitation		
11	Circular Speed (m/s)	$v_t = \frac{2\pi r}{T}$
12	Centripetal Acceleration (m/s^2)	$a_c = \frac{v^2}{r}$
13	Centripetal Force (N)	$F_c = \frac{mv_t^{\,2}}{r}$
14	Torque (N·m)	$\tau = Fr$
15	Gravitation (N)	$F_G = \frac{Gm_1m_2}{r^2}$
16	Acceleration due to gravity (m/s^2)	$g = \frac{Gm}{r^2}$
Momentum		
17	Momentum (kg·m/s)	$p = mv$
18	Conservation of Momentum	$\Sigma p_i = \Sigma p_f$
19	Impulse-Momentum Theorem (impulse: N·s)	$J = Ft = \Delta p = m(v_f - v_i)$
Work, Power, Energy		
20	Work (J, N·m)	$W = Fd$
21	Work-Energy Theorem	$W = \Delta E = E_f - E_i = Fd$
22	Power (J/s or W)	$P = \frac{W}{t}$
23	Kinetic Energy (J)	$KE = \frac{1}{2}mv^2$
24	Gravitational Potential Energy (J)	$PE_g = mgh$
25	Elastic Potential Energy (J)	$PE_{elastic} = \frac{1}{2}kx^2$
26	Conservation of Energy	$\Sigma E_i = \Sigma E_f$

Thermal Energy		
27	Thermal Energy for Temperature Change (J)	$Q = mc\Delta T$
28	Thermal Energy for Phase Change, Fusion (J)	$Q = mL_f = mH_f$
29	Thermal Energy for Phase Change, Vaporization (J)	$Q = mL_v = mH_v$
30	Heat Engine	$Q_H = Q_c + W_{out}$
31	Efficiency of a Heat Engine	$Eff. = \frac{Q_H - Q_C}{Q_H} = \frac{W_{out}}{Q_H}$
32	Internal Energy of a System (J)	$U = Q \pm W$
Electricity		
33	Electrostatic Force (N)	$F = \frac{kq_1q_2}{d^2}$
34	Electric Field (N/C or V/m)	$E = \frac{F}{q_0}$
35	Electric Power (W)	$P = IV = I^2R = \frac{V^2}{R}$
36	Electric Energy (J)	$E = Pt = IVt = I^2Rt = \frac{V^2}{R}t$
37	Current (A)	$I = \frac{V}{R} = \frac{Q}{t}$
38	Equivalent resistance in a series circuit (Ω)	$R_T = R_1 + R_2 + R_3 + \ldots$
39	Equivalent resistance in a parallel circuit (Ω)	$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$
Magnetism		
40	Magnetic Force (N)	$F = qvB$
41	Magnetic Force (N)	$F = BIL$
Waves & Optics		
42	Frequency & Period (Hz)	$f = \frac{1}{T}$
43	Speed (m/s)	$v = f\lambda$
44	Energy of a photon (J)	$E = hf$
45	Mirror & Lens Equation	$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$
46	Magnification	$m = -\frac{d_i}{d_o} = \frac{h_i}{h_o}$
47	Index of Refraction	$n = \frac{c}{v}$
48	Snell's Law of Refraction	$n_1 \sin\theta_i = n_2 \sin\theta_r$
49	Critical Angle, °	$\sin\theta_c = \frac{n_2}{n_1}$
Nuclear Energy		
50	Mass-Energy Equivalence	$E = mc^2$

Constants		
51	*G* = Gravitational Force constant	$6.67 \times 10^{-11}\ Nm^2 / kg^2$
52	Mass of a proton	1.67×10^{-27} kg
53	Mass of electron	9.11×10^{-31} kg
54	*k* = Electrical Force constant	$9 \times 10^9\ Nm^2/C^2$
55	Charge of an electron	-1.6×10^{-19} C
56	Specific Heat of Water	4186 J/kg·K
57	Specific Heat of Ice	2100 J/kg·K
58	Specific Heat of Steam	2010 J/kg·K
59	Heat of Fusion (Water)	3.33×10^5 J/kg
60	Heat of Vaporization (Water)	2.26×10^6 J/kg
61	Speed of Sound in air (at normal temp. and pressure)	340 m/s
62	*c* = Speed of Light in a vacuum	3×10^8 m/s
63	*h* = Planck's constant	6.63×10^{-34} J sec

Trigonometry		
64	Sine (sin), SOH	$\sin\theta = \frac{opposite}{hypotenuse}$
65	Cosine (cos), CAH	$\cos\theta = \frac{adjacent}{hypotenuse}$
66	Tangent (tan), TOA	$\tan\theta = \frac{opposite}{adjacent}$
Components (For forces use '*F* ' instead of '*v* ')		
67	Horizontal (x) component	$v_x = v\cos\theta$
68	Vertical (y) component	$v_y = v\sin\theta$
69	Launch/force angle if x component is known	$\cos\theta = \frac{v_x}{v}$
70	Launch/force angle if y component is known	$\sin\theta = \frac{v_y}{v}$

Temperature		
71	Kelvin to Celsius	$K = °C + 273$

Metric System Prefixes			
	Factor	**Prefix**	**Symbol**
72	10^9	giga	G
73	10^6	mega	M
74	10^3	kilo	k
75	10^{-2}	centi	c
76	10^{-3}	milli	m
77	10^{-6}	micro	μ
78	10^{-9}	nano	n