'O' Level Physics Formula Sheet

Base SI Units KgSI Unit for mass: Kilogram SI Unit for length: metre sSSI Unit for length: metre SI Unit for time: second AASI Unit for time: second SI Unit for Temperature: Kelvin molNumber Prefix n (10°)nano milli c (10°)m (10°)nano milli c (10°)m (10°)nano milli deciK (10°)MegaAverage Speed s = $\Delta d / \Delta t$ $\Delta d = total distance travelled (area underspeed-time graph)\Delta x = total displacement\Delta x = total displacement-time graph\Delta x = total displacement time graph\Delta x = t$	Measurements				
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$\rho = \frac{m}{V} \qquad \qquad m = mass \\ V = volume$		g = gravitational field strength			
$\rho = \frac{1}{V}$ $V = \text{volume}$					
V V V V V V	o = -				
	V				
Turning effect of Force					
Moment of Force M = Moment					
M = F d $F = force$	$\mathbf{M} = \mathbf{F} \mathbf{d}$				
$d = \perp$ distance from force to pivot		$d = \perp$ distance from force to pivot			

Principle of Moment	For a body in rotational		
Σ Anticlockwise Moment	1 /		
$=\Sigma$ Clockwise Moment	Sum of ACW Moment = sum of		
	CW Moment		
	Pressure		
Pressure F	F = Force over area, A		
$\mathbf{P} = \frac{1}{2}$			
A	A = Area		
Pressure of liquid	P = Pressure		
column	$\rho = \text{density},$		
$\mathbf{P} = h\rho g$	h = height of liquid column		
	g = gravitational field strength.		
Energy	Work and Power		
	W = work done		
Work Done			
$\mathbf{W} = \mathbf{Fd}$	F= force		
-	d= distance in direction of force		
Power	Work done per unit time, t		
$\mathbf{P} = \mathbf{W}/\mathbf{t} = \mathbf{F}\mathbf{v}$			
Kinetic Energy	$E_k = Kinetic Energy$		
$\mathbf{E}_{\mathbf{k}} = \frac{1}{2} \mathbf{m} \mathbf{v}^2$	m = mass		
$\mathbf{E}_{\mathbf{k}} = \frac{1}{2}$ mV ²	v = velocity		
Gravitational Potential	g = gravity = 9.81 m/s		
Energy	h = height		
$\mathbf{E}_{\mathbf{p}} = \mathrm{mgh}$	m = mass		
Conservation of Energy	$E_1 = Total Energy Before$		
$E_1 = E_2$	$E_2 = Total Energy After$		
$\mathbf{E}_1 = \mathbf{E}_2$			
	Energy cannot be created or		
	destroyed. It can only be		
	transformed or converted into other		
	torma		
	forms.		
Kinetic	Model of Matter		
	Model of Matter		
<i>Kinetic</i> Ideal Gas Law PV ∞ T	<i>Model of Matter</i> P = pressure of fixed mass of gas		
Ideal Gas Law	Model of Matter P = pressure of fixed mass of gas V = volume occupies by fixed mass		
Ideal Gas Law	Model of Matter P = pressure of fixed mass of gas V = volume occupies by fixed mass of gas		
Ideal Gas Law $PV \propto T$	Model of Matter P = pressure of fixed mass of gas V = volume occupies by fixed mass of gas T = Temperature of gas		
Ideal Gas Law	Model of Matter P = pressure of fixed mass of gas V = volume occupies by fixed mass of gas T = Temperature of gas Subscript 1 = initial state		
Ideal Gas Law $PV \propto T$ $P_1V_1 = P_2V_2$	Model of Matter P = pressure of fixed mass of gas V = volume occupies by fixed mass of gas T = Temperature of gas Subscript 1 = initial state Subscript 2 = final state		
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Ideal Gas Law $PV \propto T$ $P_1V_1 = P_2V_2$ <i>Thermal I</i> Specific Heat Capacity $E = m c \Delta T$ Latent Heat For melting, $E = m L_{fusion}$ For boiling, $E = m L_{vaporization}$	Model of MatterP = pressure of fixed mass of gasV = volume occupies by fixed massof gasT = Temperature of gasSubscript 1 = initial stateSubscript 2 = final stateProperties of Matterc = Specific heat capacity (Energy required to raise the temperature of 1 kg of the object by 1 °C)m = mass ΔT = change in temperature. L_{fusion} = latent heat of fusion (Energy required to change 1 kg of solid to liquid at the constant temp) $L_{vaporization}$ = latent heat of vaporization (Energy required to change 1 kg of liquid to gas at the constant temp) m = mass		
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'O' Level Physics Formula Sheet

Light		
Law of Reflection	Normal	
$\Theta_i = \Theta_r$		
$O_1 O_r$	Θ_{i} Θ_{r}	
Θ = angle of incidence		
Θ_i = angle of incidence Θ_r = angle of reflection	¥	
Snell's Law (refraction)		
Shell's Law (refraction)	Normal	
$n_1 Sin \Theta_i = n2 Sin \Theta_r$	Θ_i n_1 = refractive index 1	
Θ_i = angle of incidence		
Θ_r = angle of refraction	Θ_{r}	
Or more contraction	$n_2 = refractive index 2$	
Critical angle		
8	Normal	
n_2	$n_1 = refractive index 1$	
$\sin \Theta_{c} = \frac{n_2}{n_1}$	$\Theta_{\rm c}$ $\Theta_{\rm c}$	
	\ <u></u>	
(special case of Snell's		
law where $\Theta_{\rm r} = 90^{\circ}$)	$n_2 = refractive index 2$	
	$n_2 = 10110011001100112$	
Refractive Index	c = speed of light in vacuum.	
$\mathbf{n} = \frac{\mathbf{c}}{\mathbf{c}}$	v = speed of light in medium	
$m - \frac{1}{V}$	Higher reflective index of a	
	medium means light travel slower	
(n of air ≈ 1)	in the medium	
Magnification	M = magnification	
$\mathbf{M} = \frac{\mathbf{h}_{i}}{\mathbf{h}_{o}} = \frac{\mathbf{d}_{i}}{\mathbf{d}_{o}}$	h = height	
$\mathbf{M} = \frac{1}{\mathbf{h}_0} = \frac{1}{\mathbf{d}_0}$	d = distance from lens	
0 0	Subscript i = image	
	Subscript o = object	
	nt of Electricity	
Current	Current = rate of flow of charges	
$\mathbf{I} = \mathbf{Q} / \Delta \mathbf{t}$	Q = Charge	
	t=time	
Ohm's Law	V = voltage,	
Resistance	R = resistance	
$\mathbf{R} = \mathbf{V} / \mathbf{I}$	I = current	
Resistance of a wire	$\rho = \text{resistivity}$	
$\mathbf{R} = \rho L/A$	L = length of wire	
	A = cross sectional area	
<i>D</i> .	C. Circuits	
Kirchoff's 1 st Law	Conservation of charges.	
	$\sum I_{in}$ = Sum of current going into a	
$\sum I_{in} = \sum I_{out}$	junction	
	$\sum_{i} I_{out} = $ Sum of current going out	
TZ' L. CC And T	of a junction	
Kirchoff's 2 nd Law	$\sum V = $ Sum of potential difference V	
	across all components in a circuit $E M E = Voltage supplied by the$	
$\sum V = E. M. F$	E.M.F = Voltage supplied by the power supply	
Resistance in Series	power supply.	
ACSISTANCE III SELLES		
$R_{total} = R_1 + R_2 + R_3$	$- R_1 - R_2 - R_3 \rightarrow$	
Resistance in Parallel	V	
$\frac{1}{R_{\text{total}}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$	R_1	

Practical Electricity				
Electric Power	P = Power			
	V = voltage			
$\mathbf{P} = \mathbf{VI} = \mathbf{V}^2 / \mathbf{R} = \mathbf{I}^2 \mathbf{R}$	R = resistance			
	I = current			
Electrical Energy	E = energy output			
$\mathbf{E} = \mathbf{Pt} = (\mathbf{VI})\mathbf{t}$	P = power			
	t = time			
	V = voltage			
	I = current			
Elect	Electromagnetism			
Transformer	V = voltage			
V _p N _p	N = number of coils			
$\frac{V_{p}}{V_{s}} = \frac{N_{p}}{N_{s}}$	I = current			
(ideal transformer)	Subscript p = primary coil			
$V_P I_P = V_s I_s$	Subscript $s =$ secondary coil			
Right hand grip	1 5			
	field			
Fleming's Right Hand Rule	motion or larce F magnetic field B induced current /			
Fleming's Left Hand Rule	Icros F magnetic field B Idt hand			

Prepared by <u>etuitionx</u> (http:/physictuition.blogspot.com)

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2. Education Haven (http://matchtutor.com.sg)