Formulas in current electricity (Direct Current)

1	Electric Current	i=q/t	"q" is charge passing in normal direction through a cross section of conductor in time "t"
2	Drift velocity V_d with Electric field	$V_d = \frac{-e\vec{E}\tau}{m}$	e is charge and m is mass on electron, E is electric field, τ is relaxation time.
3	Current I with Drift velocity V_d	$I = n\, e\, A\, V_d$	n is number density with of free electrons, A is area of cross section.
4	Mobility of charge "μ"	$\mu = V_d / E = \frac{q\tau}{m}$	
5	Mobility and drift velocity	$V_d = \mu_e E$	
6	Current and Mobility	I= Ane x $\mu_e E$	
7	Resistance, P.D., and Current	R = V / I	V Potential Difference, I Current .
8	Resistance R with specific Res.	$R = \rho \frac{l}{A}$	*l* is length of conductor and A is area of cross section
9	Specific Resistance, ρ	$\rho = R \frac{A}{l}$	
10	Resistivity with electrons	$\rho = \frac{m}{ne^2 \tau}$	
11	Current density J	$\vec{J} = I / \vec{A}$	I is current, J current density, A is area of cross section
12	Current density magnitude	J A cosθ = I	θ is angle between $\vec{J}$ and $\vec{A}$
13	Conductance G	G = 1/R	
14	Conductivity σ	$\sigma = 1/\rho$	ρ is specific resistance
15	Microscopic form of Ohms Law	$J = \sigma E$	E is electric field
16	Temperature coefficient of Resistance α	$\alpha = \frac{Rt - R_0}{R_0\ X\ t}$	R_o is resistance at 0_o C. R_t is resistance at t^o and "t" is temperature difference.
17	Resistances in series	$R = R_1+R_2+R_3$	Same current through all resistances (circuit Current
	Resistances in parallel	$1/R_e = 1/R_1 + 1/R_2 + 1/R_3$	Same P.D. across each resistance (V of cell)
18	In a cell, emf and internal resistance	$I = \frac{E}{R+r}$	I is current, E is emf, R is external resistance, r is internal resistance.
19	In a circuit with a cell	V = E - Ir	V is terminal potential difference
20	n Cells of emf E in series	Emf = nE	
21	Resistance of n cells in series	nr + R	r is internal resistance of one cell, R external Resistance
22	Current in circuit with n cells in series	$I = \frac{nE}{R+nr}$	r is internal resistance of one cell, R external Resistance
23	n cells in parallel, then emf	emf = E	
24	n cells in parallel, resistance	R + r/n	R external resistance, r internal resistance
25	Cells in mixed group, condition for maximum current	$R = \frac{nr}{m}$	n is number of cells in one row, m is number of rows. r is internal resistance, R external resis.
26	Internal resistance of a cell	$r = \left(\frac{E-V}{V}\right) \times R$	E is emf, V is terminal Potential difference, R is external resistance.
27	Power of a circuit	$P = I.V = I^2R = V^2/R$	
28	Energy consumed	E = I.V.ΔT	ΔT is time duration
29	Kirchoff Law (junction rule)	$\Sigma i = 0$	Sum of currents at junction is zero.
30	Kirchoff Law (Loop rule)	$\Sigma V = 0$	In a loop sum of all p.d.*s* is Zero