Name _____ **Independent Work Packet**

CONCEPT/TERM	VARIABLE	UNIT/ Value	Vector or Scalar	EQUATION/NOTE
Charge	q	C or e	S	$1e = 1.6\times10^{-19}C$ into C $\times \frac{1.6\times10^{-19}C}{1e}$ into e $\frac{1}{1.6\times10^{-19}C}$ $q=It$
Electric Field Strength	E	N/C	S	$E=F_e/q$ for uniform field between Parallel plates
Electric (electrostatic) Force	F_e	F	V	$F_e = Eq$ [uniform field Parallel plates] $F_e = \frac{Kq_1q_2}{r^2}$ [point charges
Current	I	A or q/s	S	$I=q/t$ Charge q must be in Coulombs
Elementary charge	q	e	S	the electron & proton are both an elementary charge $1e = 1.6\times10^{-19}C$
Distance between centers or charge	r	m	S	$F_e = \frac{Kqq}{r^2}$ F_e & r have an inverse square relationship r & F_e have an inverse square root relationship
Electrostatic Constant	K	$N\,m^2/C^2$	S	$K = 8.99\times10^9 N\,m^2/C^2$
Work done on a charge (electrical energy)	W	J or eV	S	$W = Vq$ for q in Coulomb Work & energy measured in Joules for q in elementary charge measured in eV $1eV = 1.6\times10^{-19}J$
Potential Difference	V	V or J/C	S	$V = W/q$
Resistance	R	Ω	S	$R = \frac{\rho L}{A} = \frac{\rho L}{\pi r^2}$ $R = V/I$
Proton Charge	q	e or $1.6\times10^{-19}C$	S	
Electron Charge	q		S	
Proton or neutron Mass	m_p, m_n	$1.67\times10^{-27}kg$	S	
Electron mass	m_e	$9.11\times10^{-31}kg$	S	due to small mass electron has more acceleration than proton for same charge
Length of conductor	L	m	S	$R = \frac{\rho L}{A}$ R & L direct. Long wire = more resistance
Cross-sectional area of conductor	A	m^2	S	Cross-section of a wire is O so $A = \pi r^2$ $R = \frac{\rho L}{A} = \frac{\rho L}{\pi r^2}$ R inverse to A R inverse square to r
Resistivity	ρ	Ωm	S	on PRT R & ρ direct
Time	t	s	S	for Current & Power t must be in seconds t is inverse to P & I
Power (electrical)	P	W, J/s, VA	S	$P = W/t = \frac{Vq}{t} = VI = I^2R = V^2/R$
Equivalent Resistance	R_{eq}	Ω	S	Series $R_{eq} = R_1 + R_2 + R_3$ Parallel $1/R_{eq} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$