

Name: _____ ID# _____ Lab Section: _____

PRE-LAB [To be completed and submitted before performing Lab # 2]
(Weight: 20%)

PART (A): (i) Ohm's Law (OL) defines the element R (resistance) as $R = V/I$, where V is the voltage (Volts) and I is the current (Amps) and R is the resistance(Ohms)
From this definition, we have $V=IR$ and $I=V/R$. The power P (Watts) dissipated in a resistance R is given by $P = VI = I^2R = V^2/R$.
In the four cases below, arbitrarily assign numerical values for the first two quantities and then use OL to fill in the value for the third (dependent) quantity.:

- (a) $I = \dots\dots\dots \text{mA}$, $V = \dots\dots\dots \text{volts}$, $R = \dots\dots\dots \text{ohms}$
- (b) $R = \dots\dots\dots \text{k}\Omega$, $V = \dots\dots\dots \text{volts}$, $I = \dots\dots\dots \text{mA}$
- (c) $V = \dots\dots\dots \text{volts}$, $R = \dots\dots\dots \Omega$, Power $P = \dots\dots\dots \text{Watts}$.
- (d) $P = \dots\dots\dots \text{kW}$, $V = \dots\dots\dots \text{volts}$, $I = \dots\dots\dots \text{A}$, $R = \dots\dots\dots \Omega$

(ii) Choose any **one** of the 5-resistor series-parallel circuits in Figure 2.4 and redraw the chosen circuit in the space below. **Assign resistance values** in the 1 k Ω to 3 k Ω range to the various resistors in each case (mark the values on the circuits) and calculate the input resistance R_{AB} of your chosen circuit .

$R_{ab} = \dots\dots\dots$

(Continued Overleaf >>>>)

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PART (B): TEC & MPT

(i) For the circuit that you selected in PART (A), Sec (ii) of this pre-lab, consider that a 15 volt DC source is connected to terminals A & B (with A positive). Then choose any one of the resistances in the circuit to be the load and re-draw the 'source-load' circuit in the space below. **Analytically** determine the TEC with respect to the chosen load. [Clearly specify the resistance which is selected as the load.] Draw the TEC showing V_T , R_T and R_L .

(ii) Find the maximum power that can be drawn from the above TEC.