

1) A lamp requires 330Ω Resistor to limit the current flow. The Voltage across the current limiting Resistor is $3V$. What is the current across the Resistor.

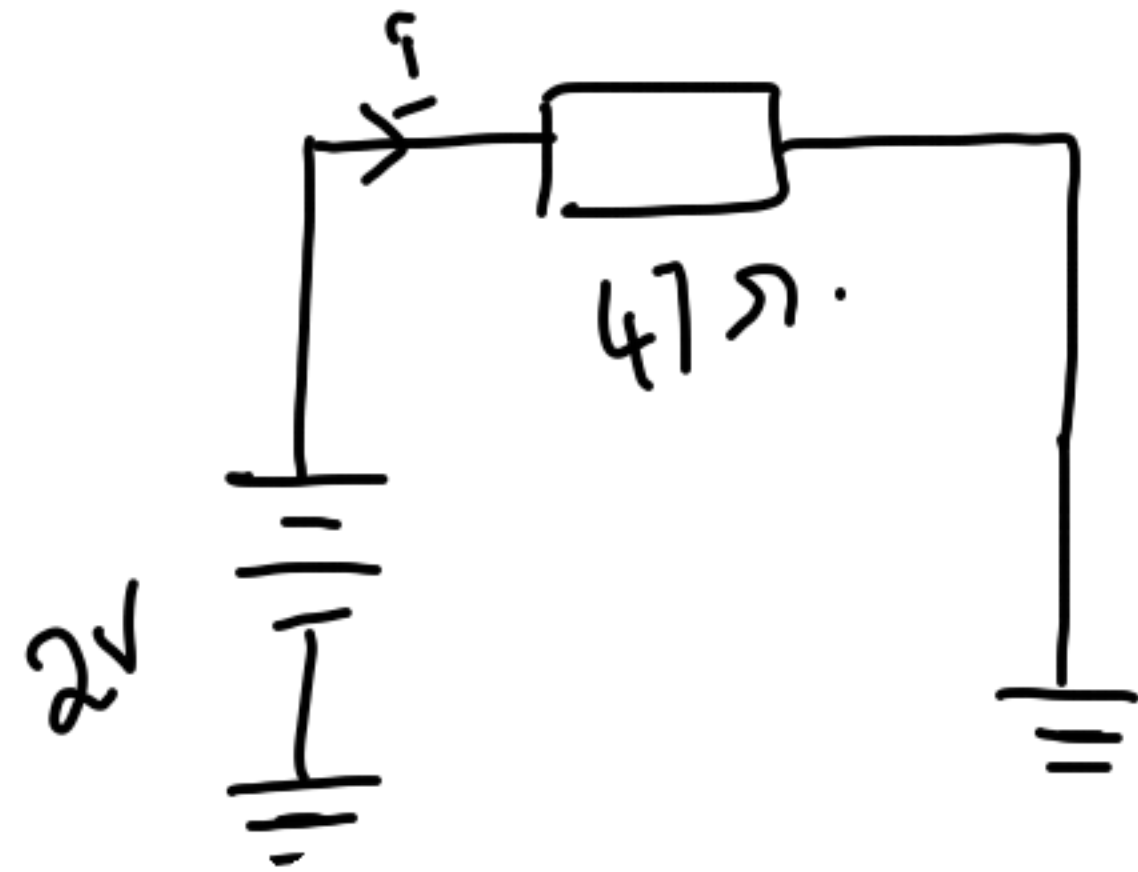
$$V = 3V, R = 330\Omega.$$

$$\begin{aligned} I &= \frac{V}{R} = \frac{3}{330} = 9.0 \times 10^{-3} \\ &= 9mA \end{aligned}$$

2) A Solar Yard light has a solar Collector that can provide $1.0W$ of power for charging the $3.0V$ batteries. What is the maximum Charging Current the Solar Collector could supply to fully discharge $3V$ battery.

$$\begin{aligned} I &= ? \quad , \quad P = 1.0W, V = 3V. \\ P &= VI, \quad I = \frac{P}{V} = \frac{1}{3} \\ I &= 0.33A \end{aligned}$$

3) Calculate Power in the following circuit.



$$R = 47\Omega, V = 2V.$$

$$P = ?$$

$$P = IV$$

$$P = \frac{V^2}{R}$$

$$P = \frac{2^2}{47}$$

$$P = 0.08 \text{ W}$$

Ohm's law.

$$I = \frac{V}{R}$$

4) An electronic power supply requires 25W of input power. It can produce an output power of 20W. Calculate the efficiency and the Power loss.

$$P_{in} = 25 \text{ W}$$

$$P_{out} = 20 \text{ W}$$

$$\eta = \text{Efficiency} = \frac{P_{out}}{P_{in}} = \frac{20}{25}$$

$$\text{Efficiency} = 0.8$$

$$\text{Power loss} = P_{in} - P_{out}$$

$$= 25 - 20$$

$$\text{Power loss} = 5 \text{ W}$$

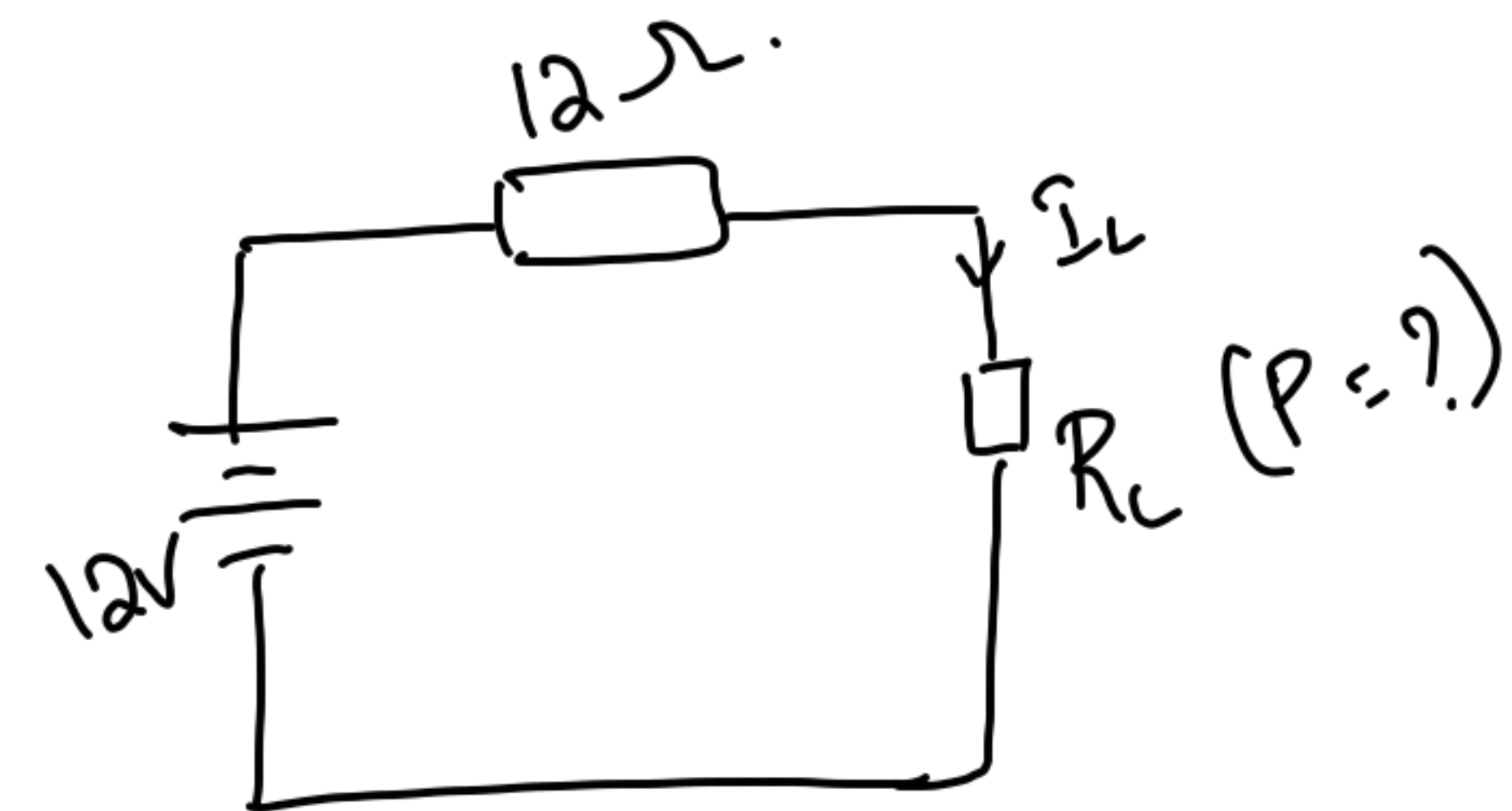
To find % of Efficiency.

$$\text{Efficiency} = 0.8 \times 100$$

$$= 80\%$$

5) If the Voltage Source of 12V has an internal Resistance of 12Ω . Calculate the Power for the ^{Load} Resistor mentioned in the table below and plot a graph.

$R_L (\Omega)$	$P_L (\text{W})$
4	2.25
8	2.88
12	3 $\Leftarrow$
16	2.96
20	2.8



$$I_L = \frac{V}{R_L + R}$$

$$P_L = I_L^2 \cdot R_L$$

When, $R_L = 4 \Omega$.

$$I_L = \frac{12}{12+4} = \frac{12}{16} = 0.75$$

$$P_L = (0.75)^2 \cdot 4$$

$$P_L = 2.25 \text{ W}$$

6). An alternating voltage is given by $v = 75 \sin(200\pi t - 90)$ volts
Calculate

- a) Amplitude
- b) Peak to peak voltage
- c) RMS value
- d) Periodic time
- e) frequency

Soln.

$$V = 75 \sin(200\pi t - 90) \quad \text{--- (1)}$$

we know that

$$V = V_m \sin(\omega t - \phi) \quad \text{--- (2)}$$

Compare both equation

$$V_m = 75 \text{ V}$$

$$\omega = 200\pi$$

$$\phi = 90^\circ$$

a) Amplitude = $V_m = 75\text{V}$

b) Peak to peak. = $2 \times V_m$
 $= 2 \times 75$
 $= 150\text{V}$

c) RMS value.

$$V_{\text{RMS}} = \frac{V_m}{\sqrt{2}} = \frac{75}{\sqrt{2}} = 53\text{V}$$

d) Time period.

$$\omega = 200\pi$$

We know that $\omega = 2\pi f$

$$2\pi f = 200\pi$$

$$2f = 200$$

$$f = \frac{200}{2} = 100\text{Hz}$$

$$T = \frac{1}{f} = \frac{1}{100} = 0.01$$

$$T = 10\text{ms}$$

e) frequency.

$$f = 100\text{Hz}$$

1) A transformer Steps up Voltage from 110V to 440V. If the Primary coil has 50 turns. How many coil does Secondary have.

$$V_p = 110V$$

$$V_s = 440V$$

$$N_p = 50 \text{ turns}$$

$$N_s = ?$$

$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

$$\frac{440}{110} = \frac{N_s}{50}$$

$$4 = \frac{N_s}{50}$$

$$4 \times 50 = N_s$$

$$N_s = \underline{\underline{200 \text{ turns}}}$$