

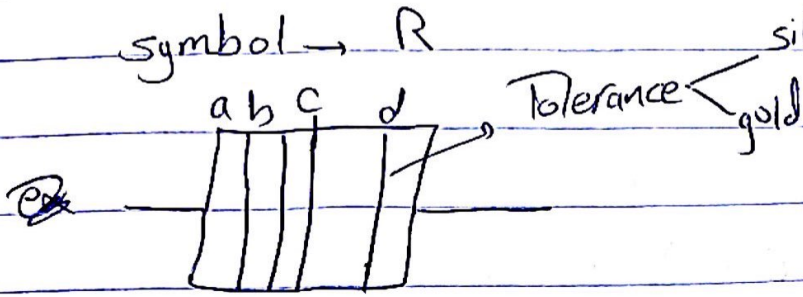
CIRCUITS LAB

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POWERUNIT

exp 1) Resistors :-

symbol $\rightarrow R$



Black $\rightarrow 0$

Brown $\rightarrow 1$

Red $\rightarrow 2$

Orange $\rightarrow 3$

Yellow $\rightarrow 4$

Green $\rightarrow 5$

Blue $\rightarrow 6$

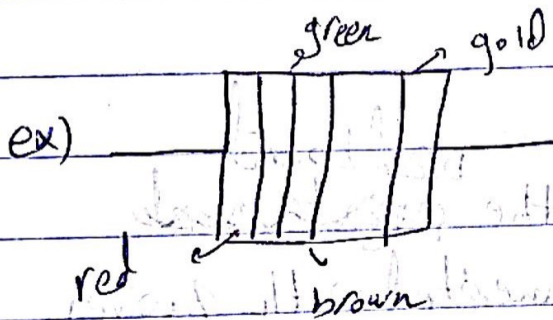
Purple $\rightarrow 7$

Grey $\rightarrow 8$

White $\rightarrow 9$

4- Color Code

$$R = ab \times 10^c \pm d$$



Tolerance (error) $\left\{ \begin{array}{l} \text{Silver} \rightarrow 10\% \\ \text{Gold} \rightarrow 5\% \end{array} \right.$

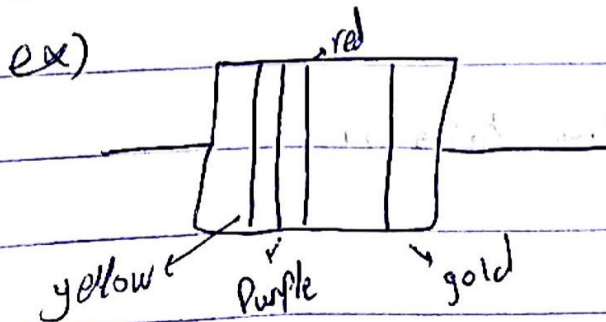
$$R = 25 \times 10^1 + \frac{5}{100} (250)$$

$$250 \pm \left(\frac{5}{100} \right) (250)$$

(— , range —)

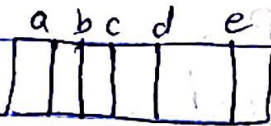
$$R = 47 \times 10^2 \pm 5\%$$

$$4700 \pm \left(\frac{5}{100} \right) (4700)$$

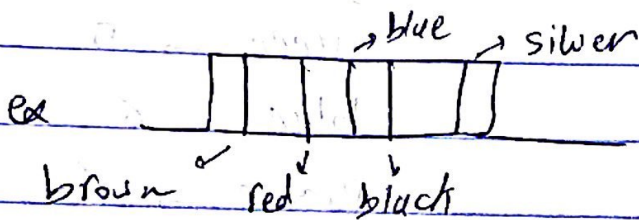


($\square \rightarrow \square$)
range

5- Color code



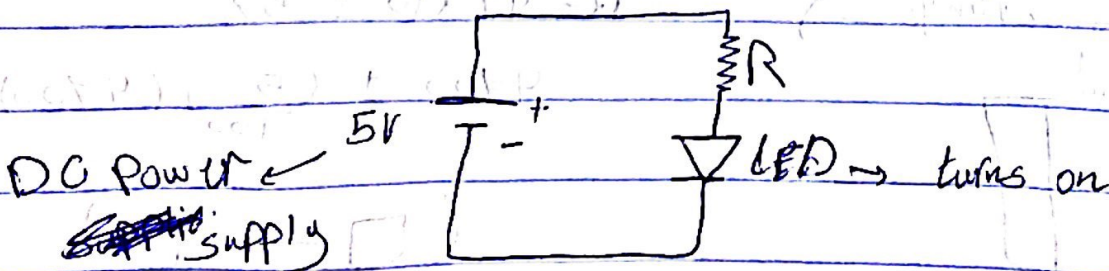
$$R = abc \times 10^d + e$$



$$R = 126 \times 10^0 + 10\%$$

every 5 horizontal holes in the ~~project board~~ ^{bread board} are considered 1 node (connected with 2 wires)

DC supplies \rightarrow ^{Don't} change with time (~~constant~~) (fixed)
 AC supplies \rightarrow change with time



Digital multimeter \rightarrow ~~is used~~ voltage / resistance / diode / capacitance
(~~connected~~) in the red node

Digital multimeter \rightarrow Connected in parallel
to measure voltages.

" " " \rightarrow Connected in series to
measure currents.

* When you measure resistance while the resistor is in the
circuit then you are measuring (Thevenin resistance).

* Digital multimeter \rightarrow Connected in parallel with a
resistor to measure its resistance.

* in the lab we will use the 2A knob to measure the
current

✓ Current limit knobs in the power supply ~~are~~ are
just for protecting from high currents. (DC)

✓ Voltage level knobs in the power supply are to
control the voltage levels. (DC)

✓ earth terminal in the power supply is internally
connected. (DC)

Function generator gives AC signal
in AC signals we determine frequency by knob

To display the signal we use the Oscilloscope
(we take the output from the function generator and connect it with the Oscilloscope.)

we can display 2 signals at the same time on the Oscilloscope.

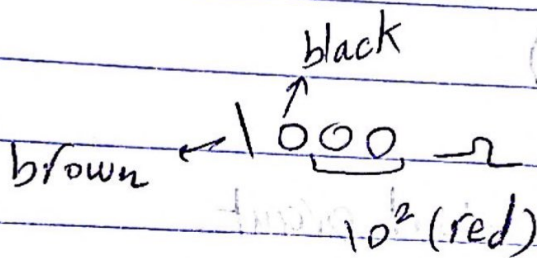
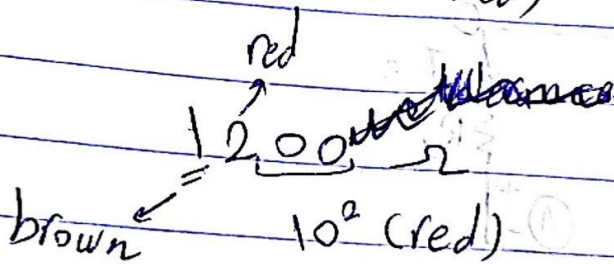
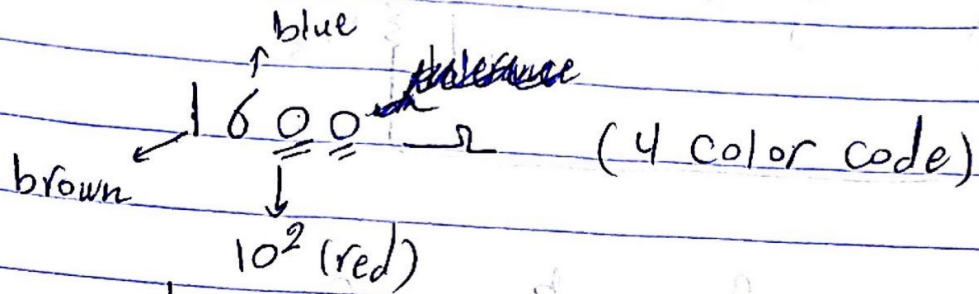
to read Peak-to-Peak = # of squares X ~~time per division~~ (scale)
Positive peak to
negative peak

to read period = # of squares X time per division

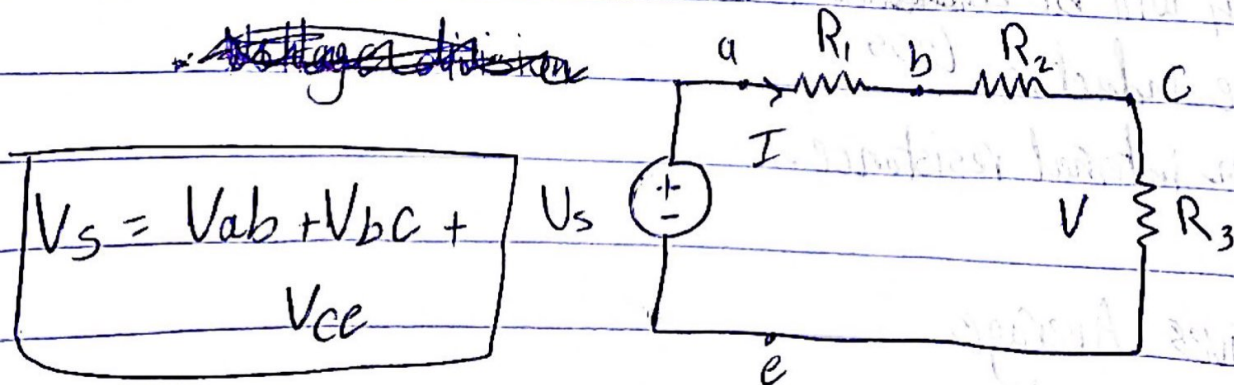
every circuit needs ground.

we don't change frequency on the Oscilloscope even if we change the scale, we can only change the frequency from the function generator.

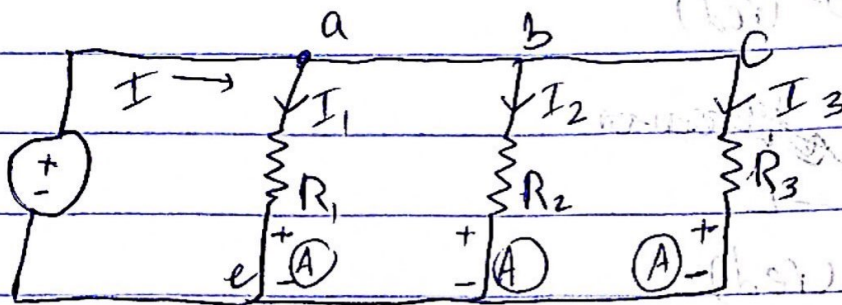
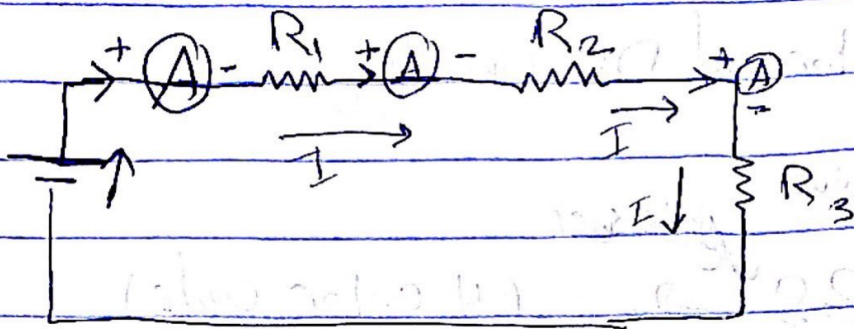
exp 2) Resistors and DC circuits.



to measure resistance we use digital multimeter as a ohmmeter.



KVL



$$I = I_1 + I_2 + I_3 \text{ (KCL)}$$

- Inductor in DC circuit is short circuit.
- Capacitor in DC circuit is open circuit.
- When we connect an inductor to branch (I_1) for example I_1 will be ~~smaller~~ less than I_1 without inductor because the inductor has an internal resistance.
- DC gives Average
- AC gives RMS