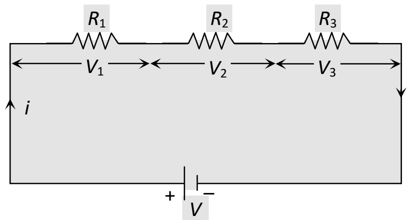
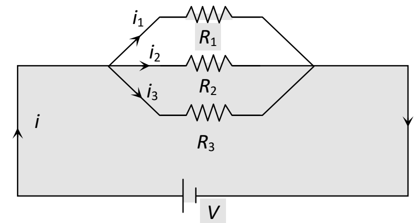
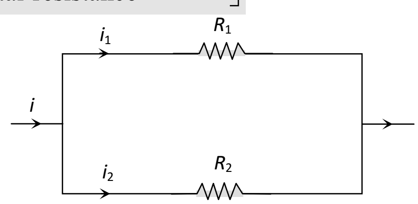
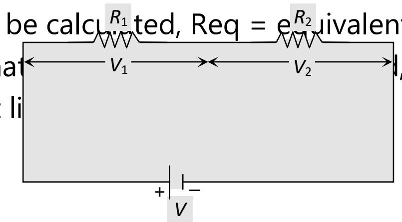
Grouping of Resistance.

Series	Parallel
(1) 	(1) 
(2) Same current flows through each resistance but potential difference distributes in the ratio of resistance i.e. $V \propto R$ Power consumed are in the ratio of their resistance i.e. $P \propto R \Rightarrow P_1 : P_2 : P_3 = R_1 : R_2 : R_3$	(2) Same potential difference appeared across each resistance but current distributes in the reverse ratio of their resistance i.e. $i \propto \frac{1}{R}$ Power consumed are in the reverse ratio of resistance i.e. $P \propto \frac{1}{R} \Rightarrow P_1 : P_2 : P_3 = \frac{1}{R_1} : \frac{1}{R_2} : \frac{1}{R_3}$
(3) $R_{eq} = R_1 + R_2 + R_3$ Equivalent resistance is greater than the maximum value of resistance in the combination.	(3) $\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ or $R_{eq} = (R_1^{-1} + R_2^{-1} + R_3^{-1})^{-1}$ or $R_{eq} = \frac{R_1 R_2 R_3}{R_1 R_2 + R_2 R_3 + R_2 R_1}$ equivalent resistance is smaller than the minimum value of resistance in the combination.
(4) For two resistance in series Req = R1 + R2	(4) For two resistance in parallel $R_{eq} = \frac{R_1 R_2}{R_1 + R_2} = \frac{\text{Multiplication}}{\text{Addition}}$
(5) Potential difference across any resistance $V' = \left(\frac{R'}{R_{eq}}\right) \cdot V$ Where R′ = Resistance across which potential	(5) Current through any resistance $i' = i \times \left[\frac{\text{Resistance of opposite branch}}{\text{Total resistance}}\right]$ 

difference is to be calc…ted, Req = e…uivalent resistance of tha… , V = p.d. across that li… e.g.  $V_1 = \left(\frac{R_1}{R_1 + R_2}\right) \cdot V$ and $V_2 = \left(\frac{R_2}{R_1 + R_2}\right) \cdot V$	Where i′ = required current (branch current) i = main current $i_1 = i\left(\frac{R_2}{R_1 + R_2}\right)$ and $i_2 = i\left(\frac{R_1}{R_1 + R_2}\right)$
(6) If n identical resistance are connected in series $R_{eq} = nR$ and p.d. across each resistance $V' = \frac{V}{n}$	(6) In n identical resistance are connected in parallel $R_{eq} = \frac{R}{n}$ and current through each resistance $i' = \frac{i}{n}$

Note: In case of resistances in series, if one resistance gets open, the current in the whole circuit become zero and the circuit stops working. Which don't happen in case of parallel gouging.

Decoration of lightning in festivals is an example of series grouping whereas all household appliances connected in parallel grouping.

Using n conductors of equal resistance, the number of possible combinations is 2n – 1.

If the resistance of n conductors are totally different, then the number of possible combinations will be 2n.