



SNS COLLEGE OF TECHNOLOGY

Coimbatore-35

An Autonomous Institution



Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A++’(III Cycle) Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

23ECB101 – CIRCUIT ANALYSIS AND DEVICES

I YEAR/ II SEMESTER

UNIT 1 – MESH AND NODE ANALYSIS OF ELECTRIC CIRCUITS

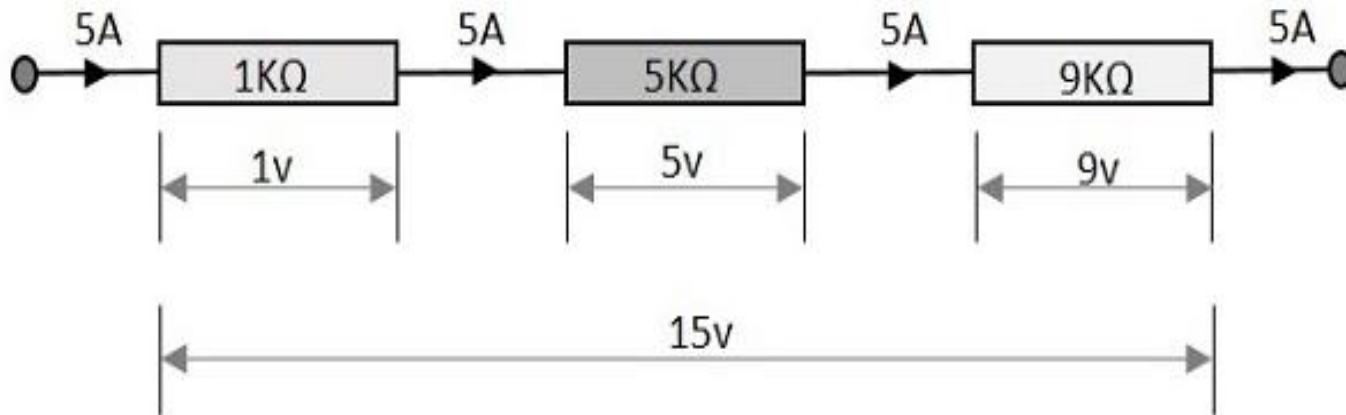
TOPIC - Resistors in Series and Parallel



Resistors in Series



- A Resistor when connected in a circuit, that connection can be either series or parallel.

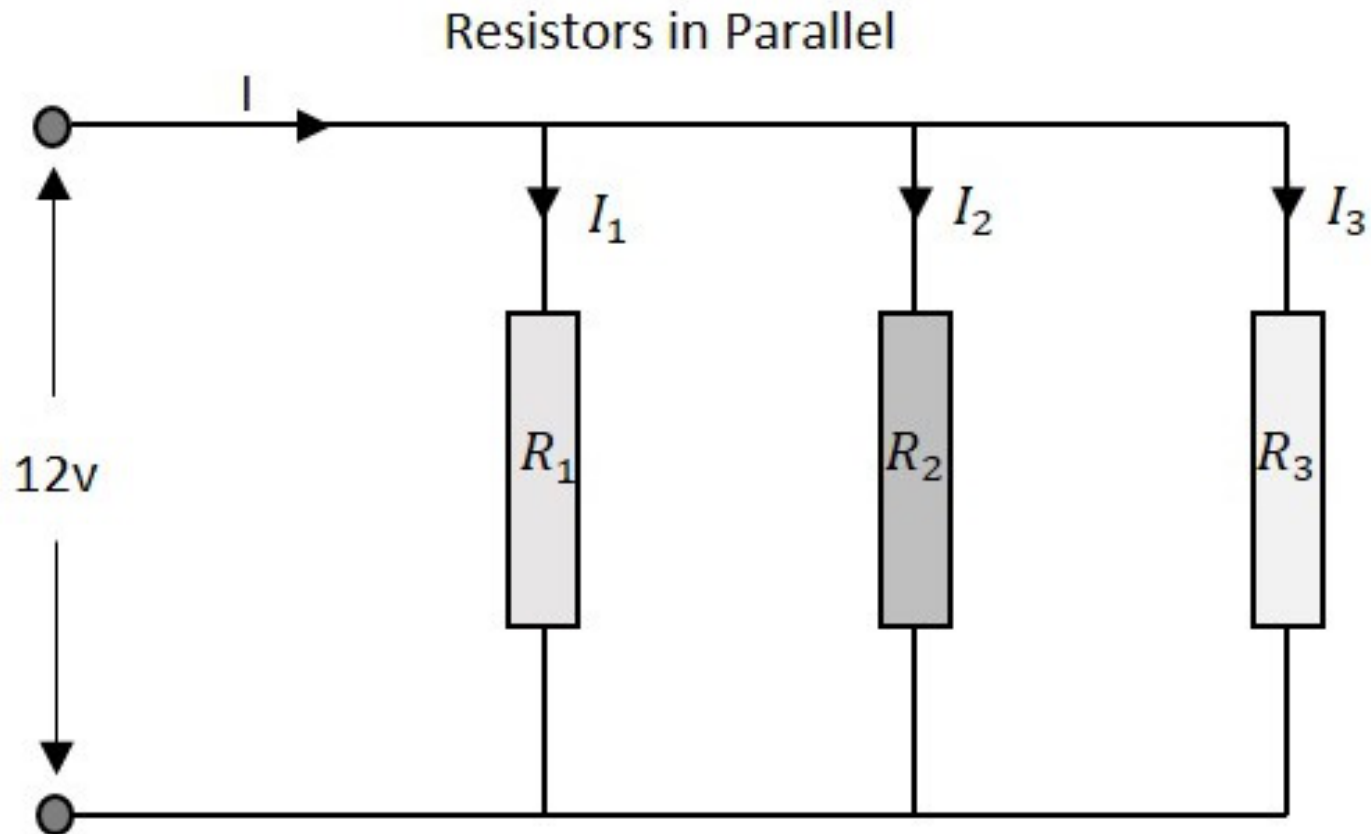




- The total resistance of a circuit having series resistors is equal to the sum of the individual resistances. That means, in the above figure there are three resistors having the values $1\text{K}\Omega$, $5\text{K}\Omega$ and $9\text{K}\Omega$ respectively.
- Total resistance value of the resistor network is – $R=R1+R2+R3$
- Which means $1 + 5 + 9 = 15\text{K}\Omega$ is the total resistance.



Resistors in Parallel





- The total resistance of a circuit having Parallel resistors is calculated differently from the series resistor network method. Here, the reciprocal $1/R$ value of individual resistances are added with the inverse of algebraic sum to get the total resistance value.
- Total resistance value of the resistor network is – $1/R=1/R1+1/R2+1/R3$



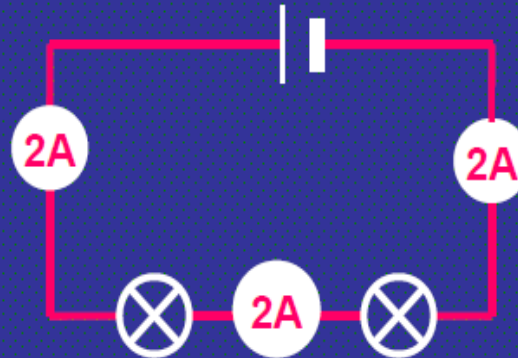
- For example, if the resistance values of previous example are considered, which means $R_1 = 1\text{K}\Omega$, $R_2 = 5\text{K}\Omega$ and $R_3 = 9\text{K}\Omega$. The total resistance of parallel resistor network will be –
- $1/R = 1/1 + 1/5 + 1/9$
 $= (45 + 9 + 5)/45 = 59/45$
 $R = 45/59 = 0.762\text{K}\Omega = 76.2\Omega$



measuring current

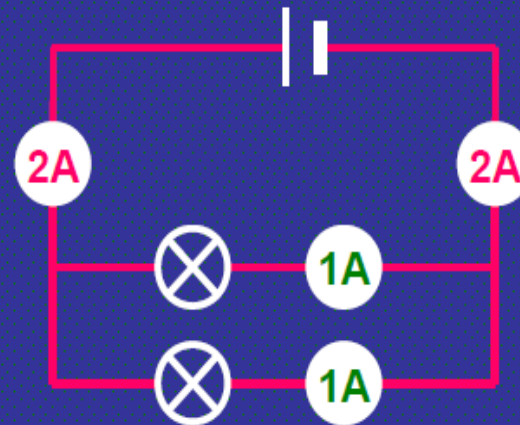
SERIES CIRCUIT

- current is the **same** at all points in the circuit.



PARALLEL CIRCUIT

- current is **shared** between the components





measuring voltage

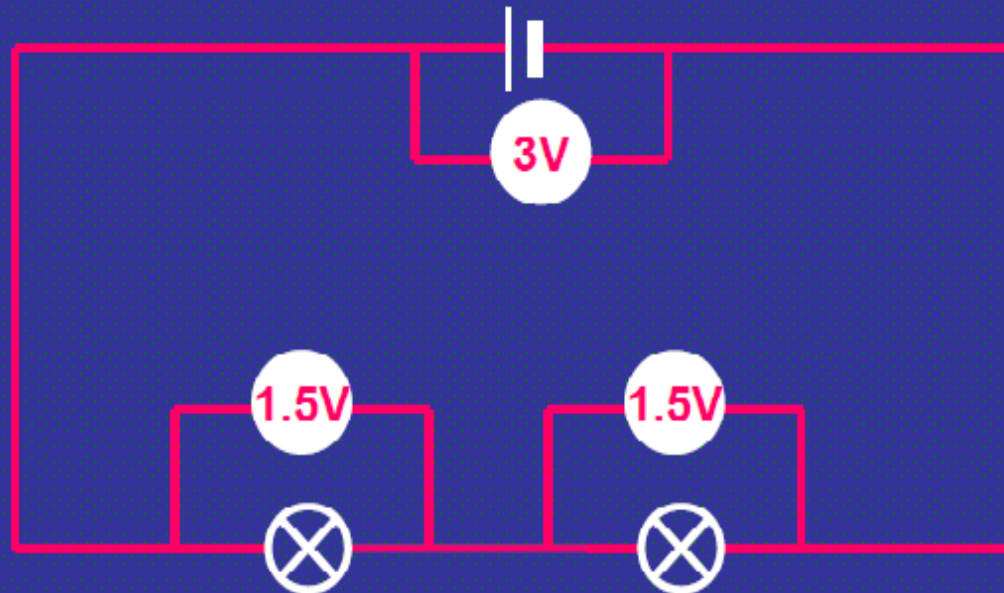
The 'electrical push' which the cell gives to the current is called the **voltage**. It is measured in **volts (V)** on a **voltmeter**





series circuit

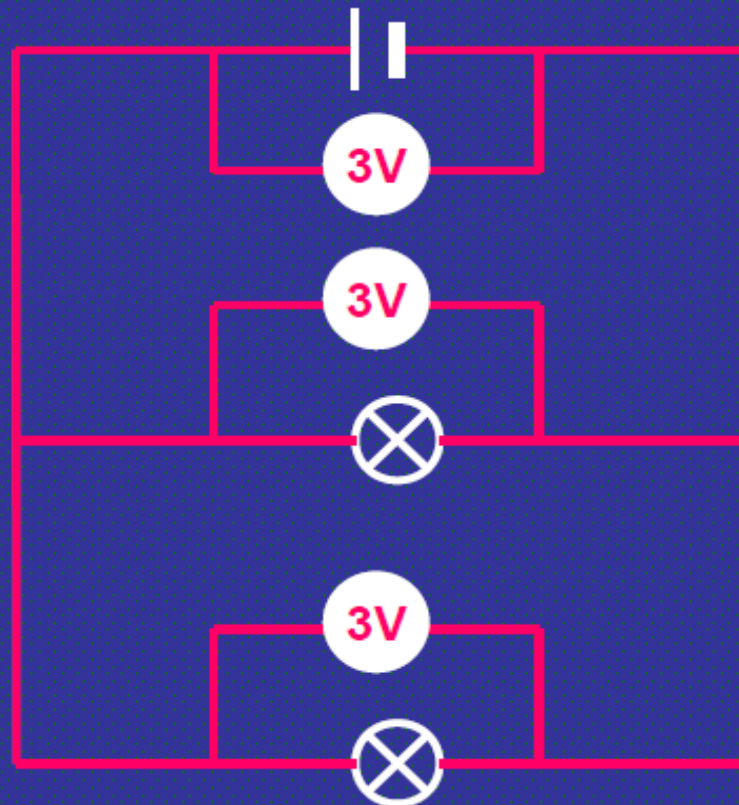
- voltage is **shared** between the components





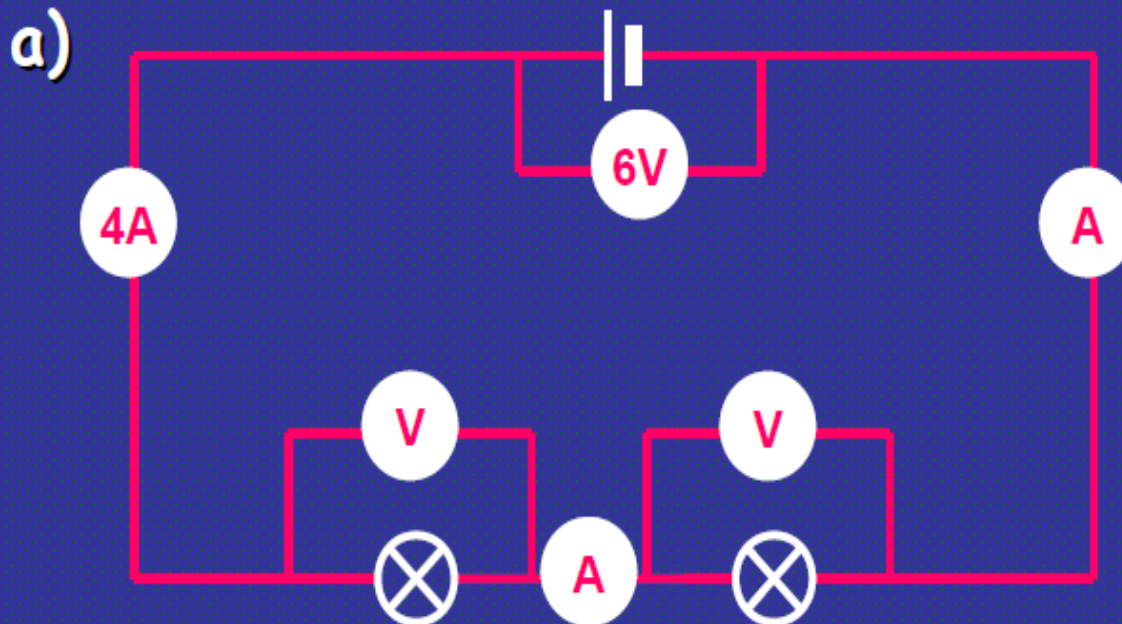
parallel circuit

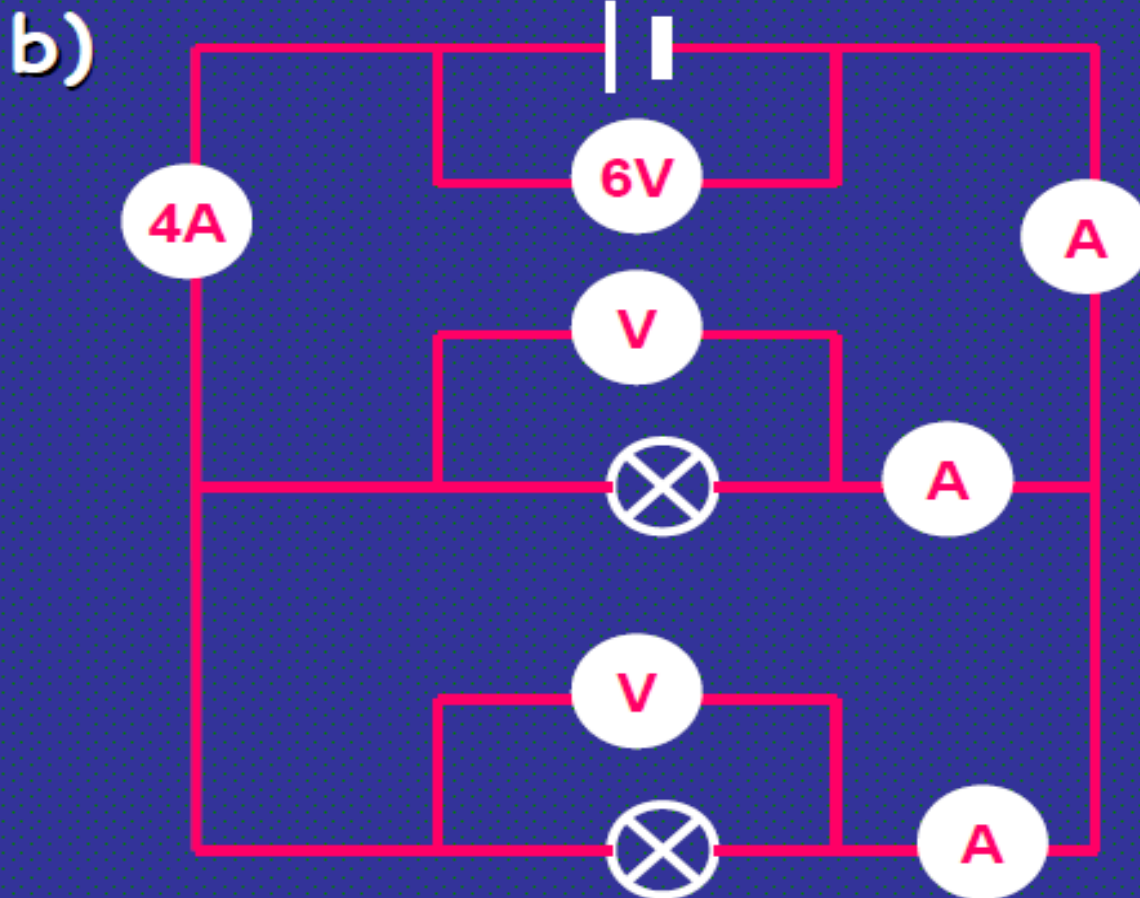
- voltage is the **same** in all parts of the circuit.





measuring current & voltage

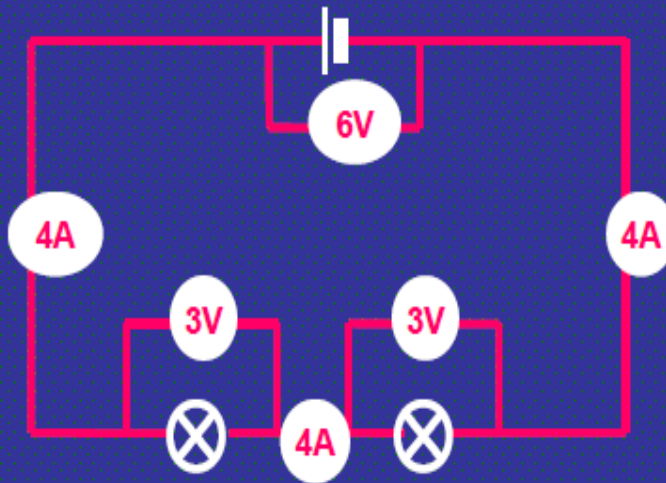




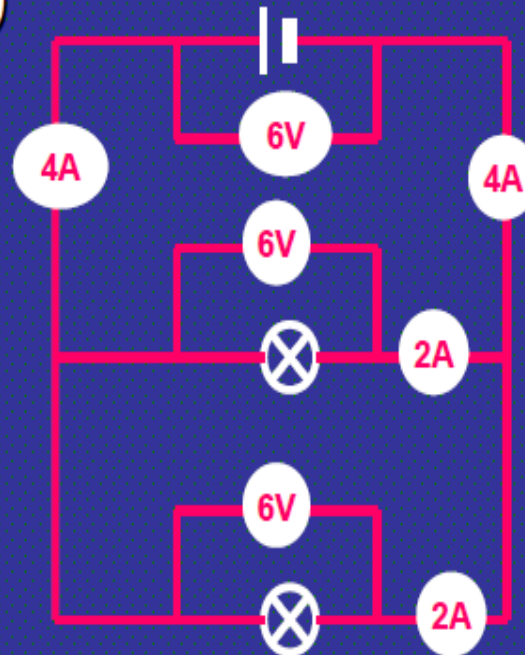


answers

a)



b)





Assessment

1. In series connection of resistors, what happens to the current across each resistor?

- a) Increases
- b) Decreases
- c) Remain the same**
- d) Initially increases and then decreases

2. Identify the combination which is not a series connection.

- a) Resistance box
- b) Decorative bulbs
- c) Fuses
- d) Domestic appliances**

3. Batteries are generally connected?

- a) Series**
- b) Parallel
- c) Either series or parallel
- d) Neither series nor parallel





THANK YOU