

PHYSICS LESSON NOTE FOR SS ONE

DATE: 12th APRIL, 2020

TOPICS: CONNECTIONS OF RESISTORS AND CELLS IN A CIRCUIT

SUB-TOPICS: RESISTORS IN SERIES AND PARALLEL CONNECTIONS

OBJECTIVES: At the end of the lessons, Students should be able to:

- 1 connect resistors in series
2. connect resistors in parallel
3. solve some calculations in series and parallel.

Contents:

Introduction

RESISTORS

Resistors are components that offer opposition to the flow of current. They are arranged in electrical circuit in two ways;

RESISTORS IN SERIES

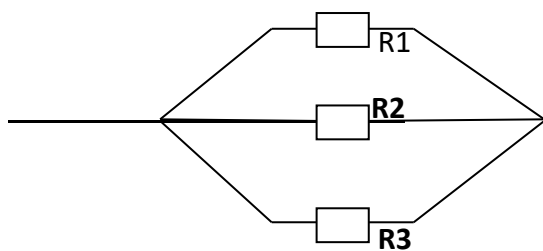
When two or more resistors are connected side by side such as the diagram below we say they are in series



$$R_{\text{eff}} = R_1 + R_2 + R_3 + \dots + R_n$$

Resistors in Parallel

When they are arranged across such that their ends are connected to common junctions, we say they are in parallel.



The effective resistance is then given as $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots + \frac{1}{R_n}$

EXAMPLE 1: Find the effective resistance of 2Ω, 5Ω and 3Ω connected in series

Solution

$$R_{\text{eff}} = R_1 + R_2 + R_3 = 2 + 5 + 3 = 10\Omega$$

EXAMPLE 2: Find the effective resistance of 5Ω, 10Ω, 4Ω connected in parallel.

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} = \frac{1}{5} + \frac{1}{10} + \frac{1}{4}$$

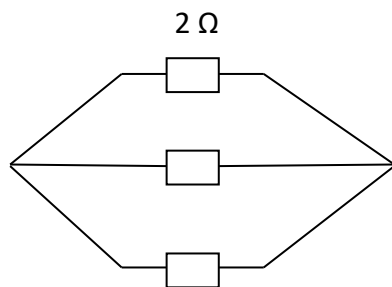
$$\frac{4 + 2 + 5}{20} = \frac{11}{20}$$

$$\therefore R_{\text{eff}} = \frac{20}{11} = 1.81\Omega$$

Assignment:

1 Find the effective resistance of 5 Ω, 6 Ω, 4 Ω connected in series.

2. Calculate the effective resistance of the diagram. If R_1 is 2 Ω, R_2 4 Ω and R_3 is 6Ω



3. Find the effective resistance of five Identical resistor connected in series 2 Ω, 5 Ω and 6 Ω

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