



# ELEMENTS OF ELECTRICAL ENGINEERING

## Course Code : UE25EE141A/B

### FACULTY CONTRIBUTED:

Department of EEE, RR Campus

Prof . Jyothi T N

Prof. Vadhira<sup>J</sup> K P P

Prof. Kruthika N

Prof. Suma S

Prof. Pushpa K R

Prof. Sangeeta Modi

Department of ECE, EC Campus

Prof. Lokesh L

Prof. Dhanashree G Bhate

Dr. Renuka R Kajur

Prof. Rajesh Chandrashekhar

Prof. Sangam Kumar G H

# ELEMENTS OF ELECTRICAL ENGINEERING

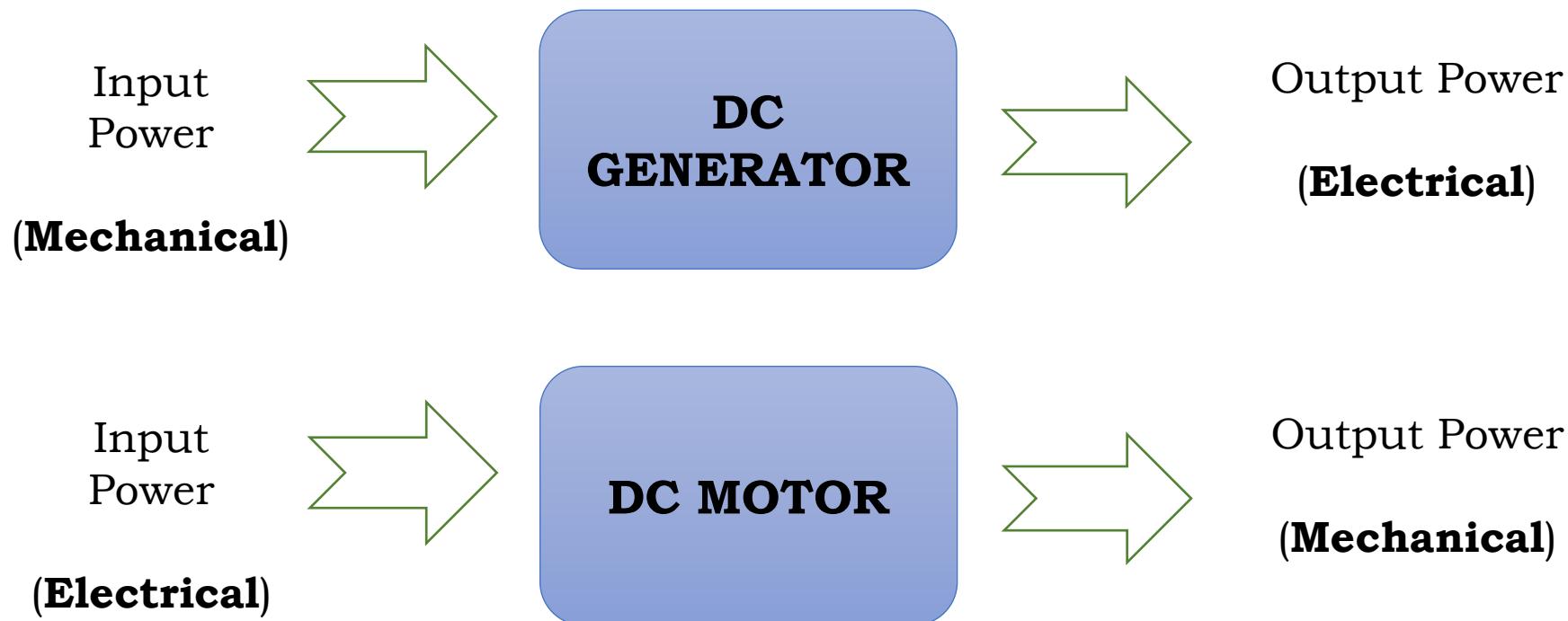
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## DC MACHINE : CONSTRUCTION

Jyothi T N

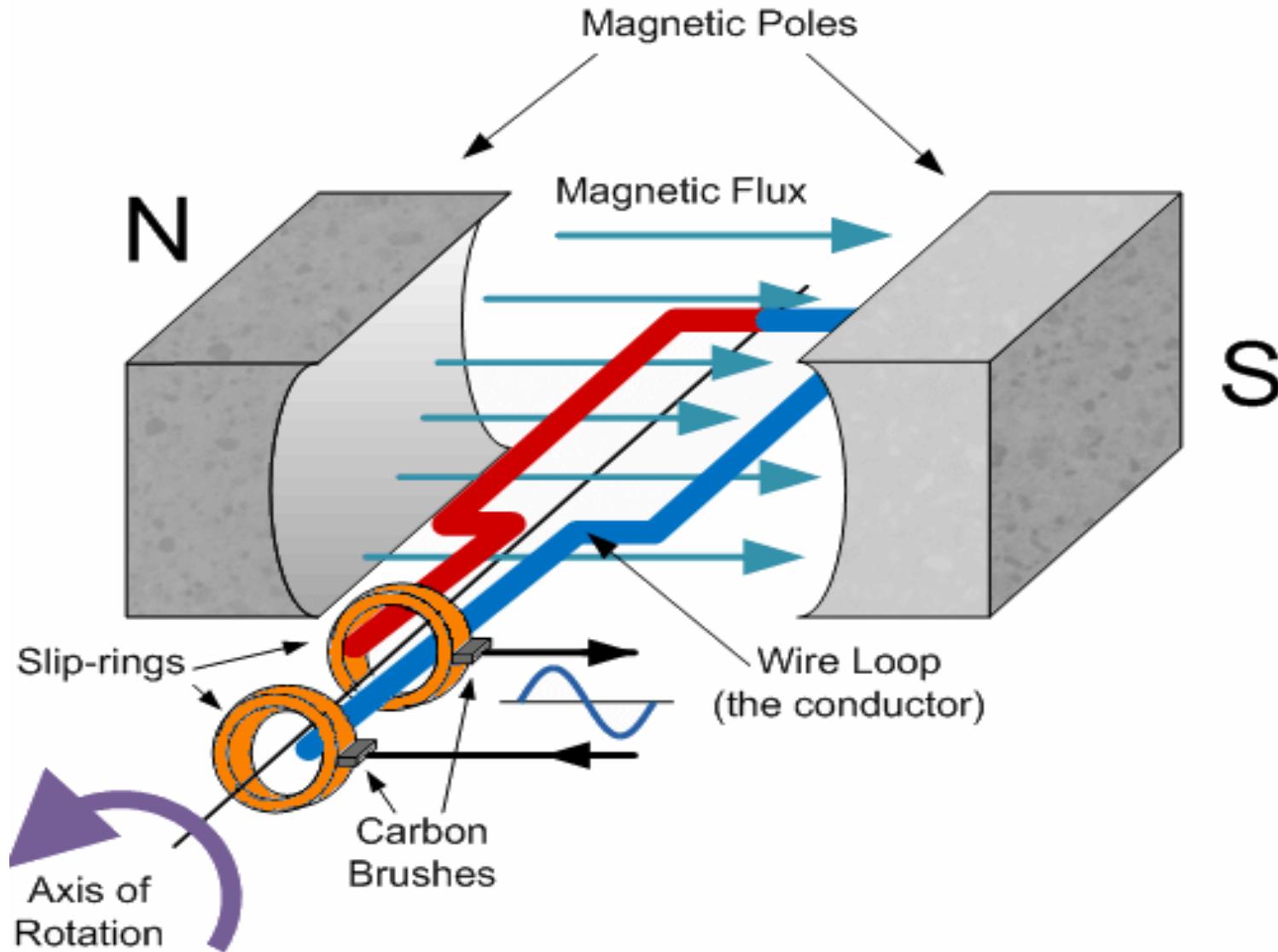
Department of Electrical & Electronics Engineering

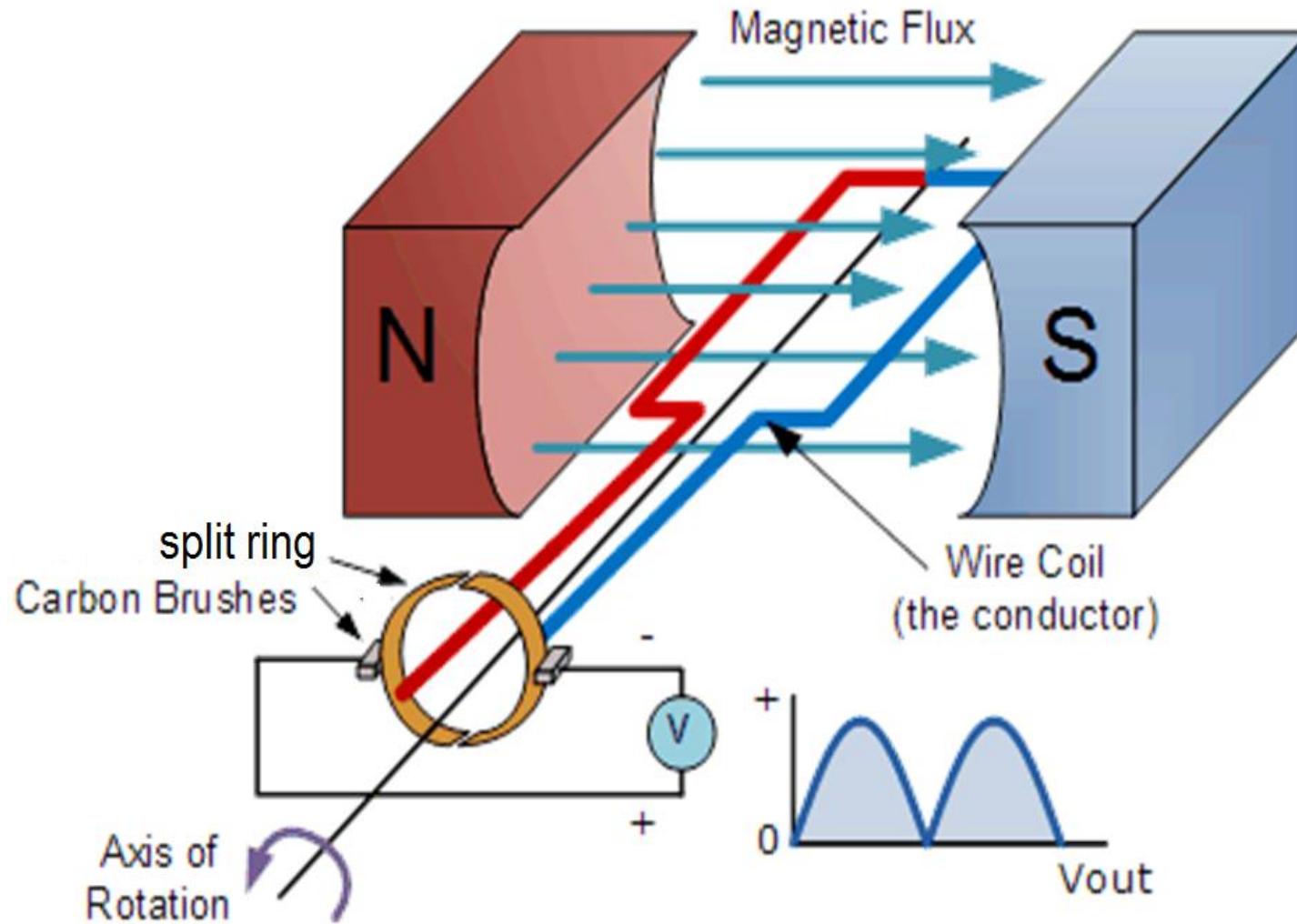
A DC Machine is an electromechanical energy conversion device which converts mechanical power to electrical power or vice versa



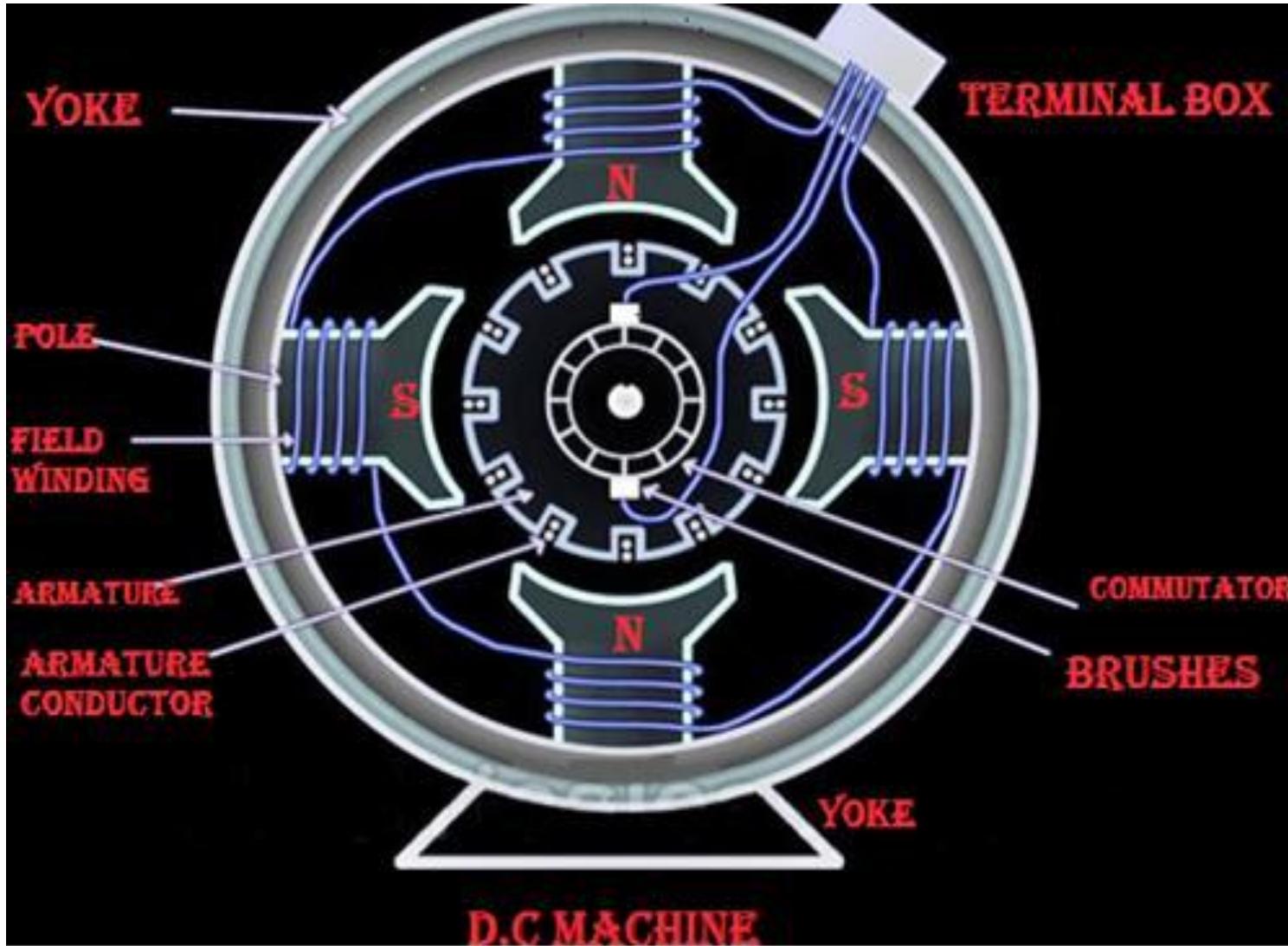
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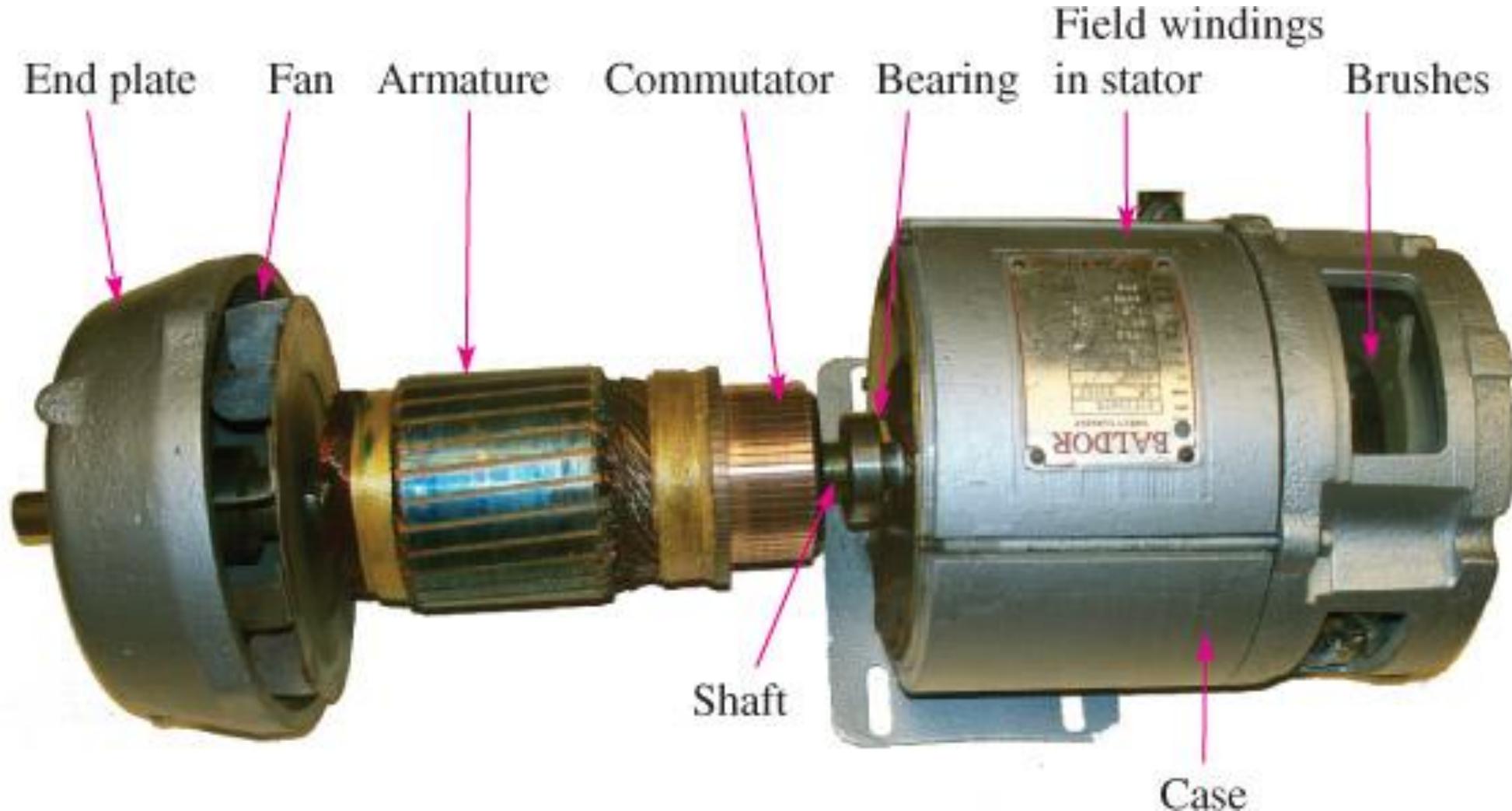
## Basic AC Generator





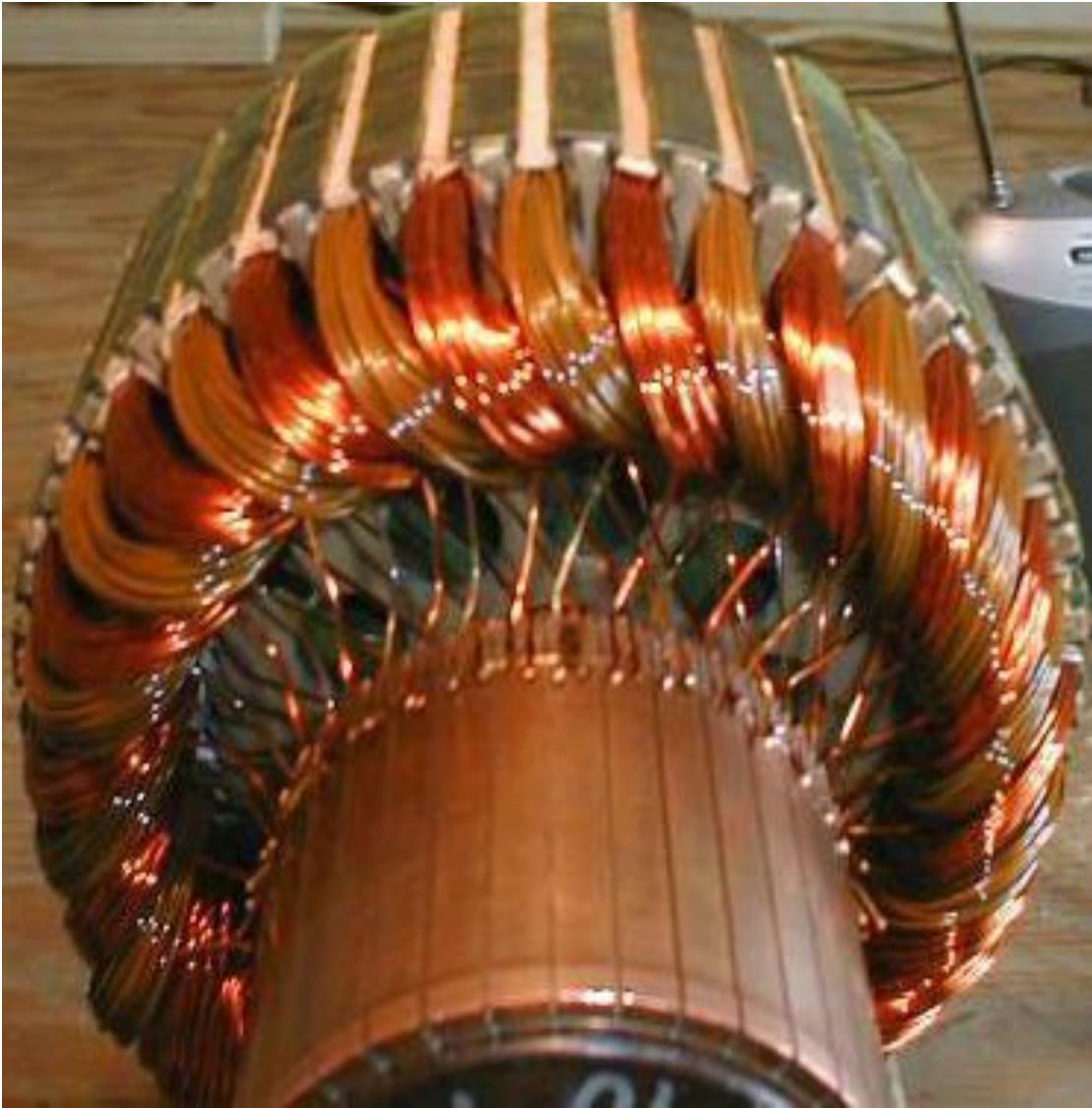
## Construction of DC Machine





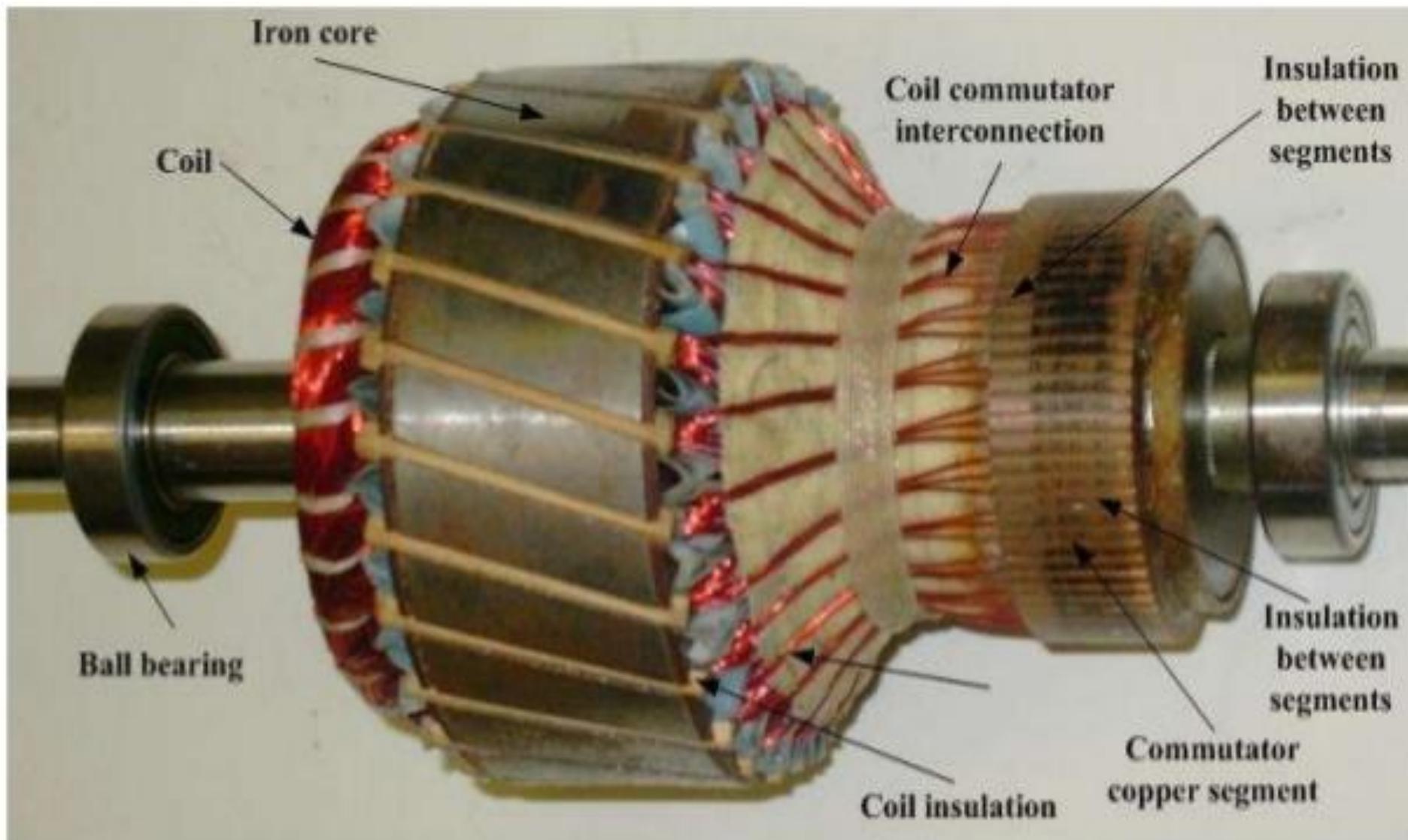
## Armature of DC Machine

### Armature Rotor



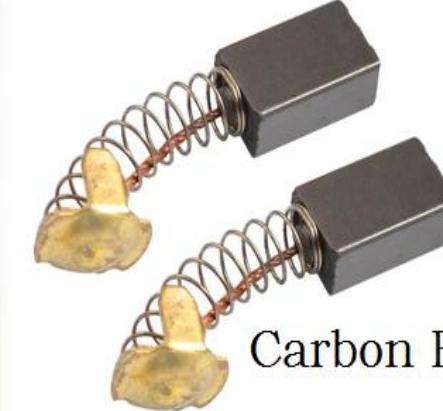
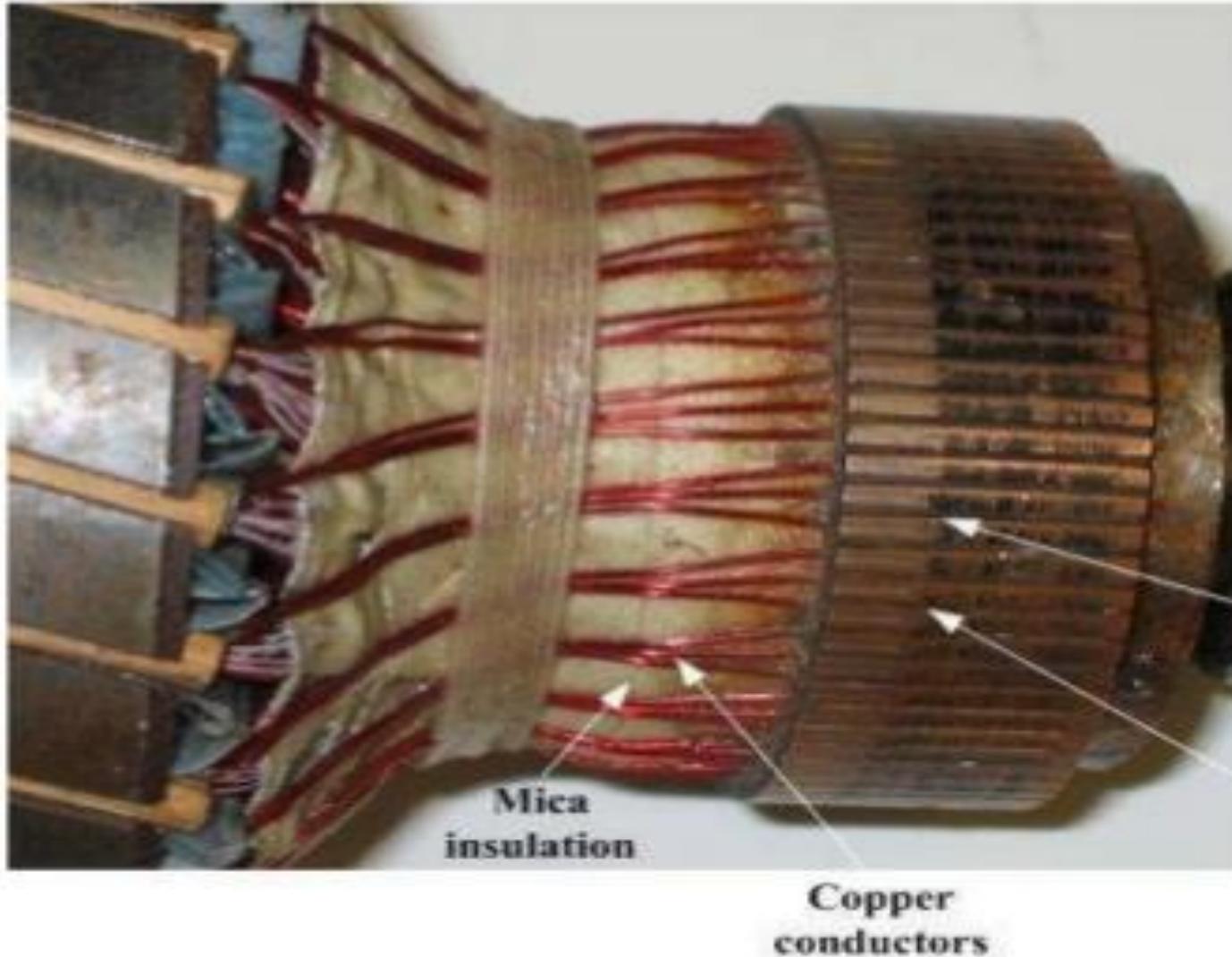
# ELEMENTS OF ELECTRICAL ENGINEERING

## Armature of DC Machine



# ELEMENTS OF ELECTRICAL ENGINEERING

## Armature of DC Machine



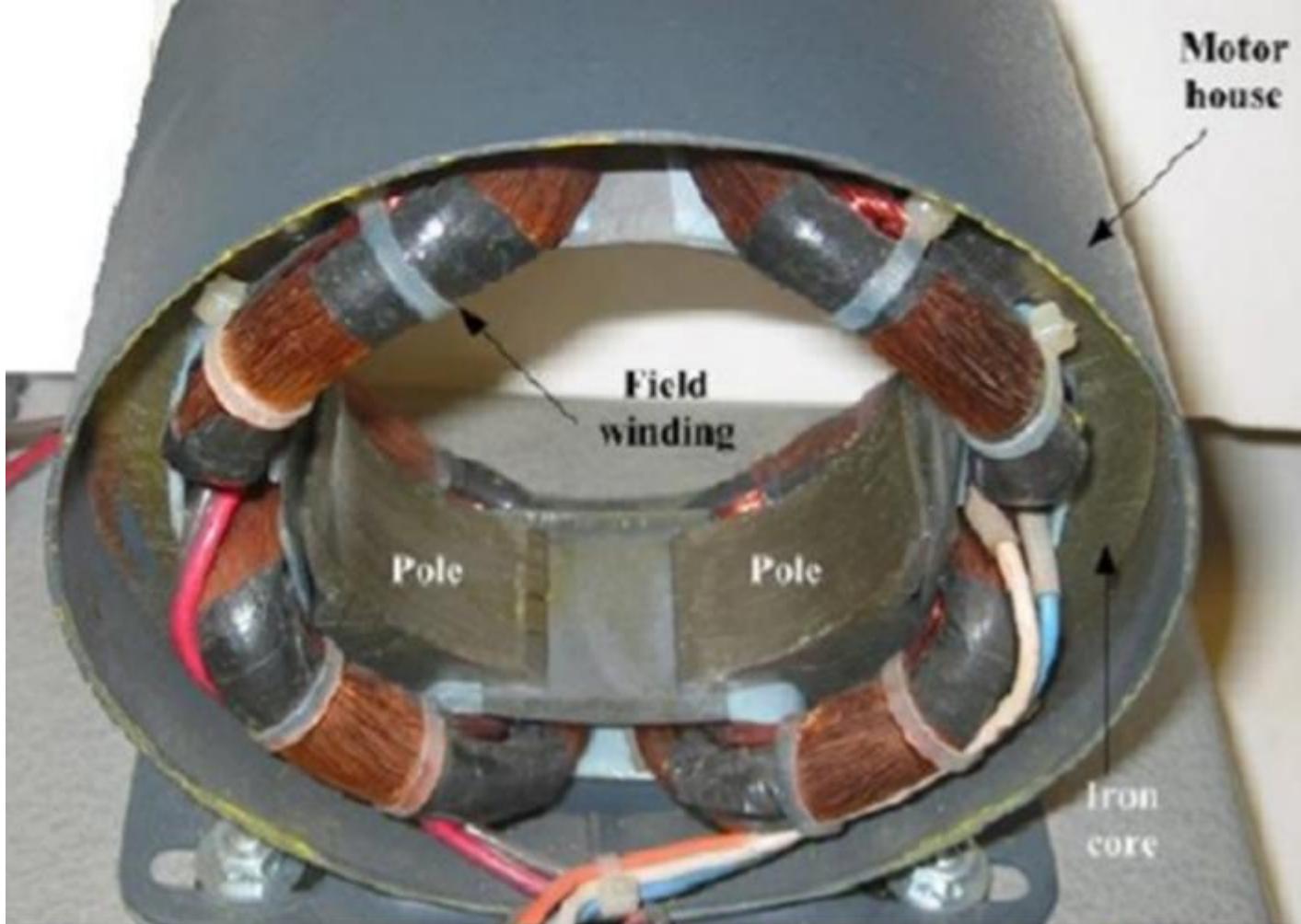
Carbon Brushes

Mica Insulation  
between segments

Copper  
segment

# ELEMENTS OF ELECTRICAL ENGINEERING

## Field system of DC Machine



## Types of Armature Winding

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**Armature Winding** of a DC Machine is wound by one of the two methods

**Lap Winding**

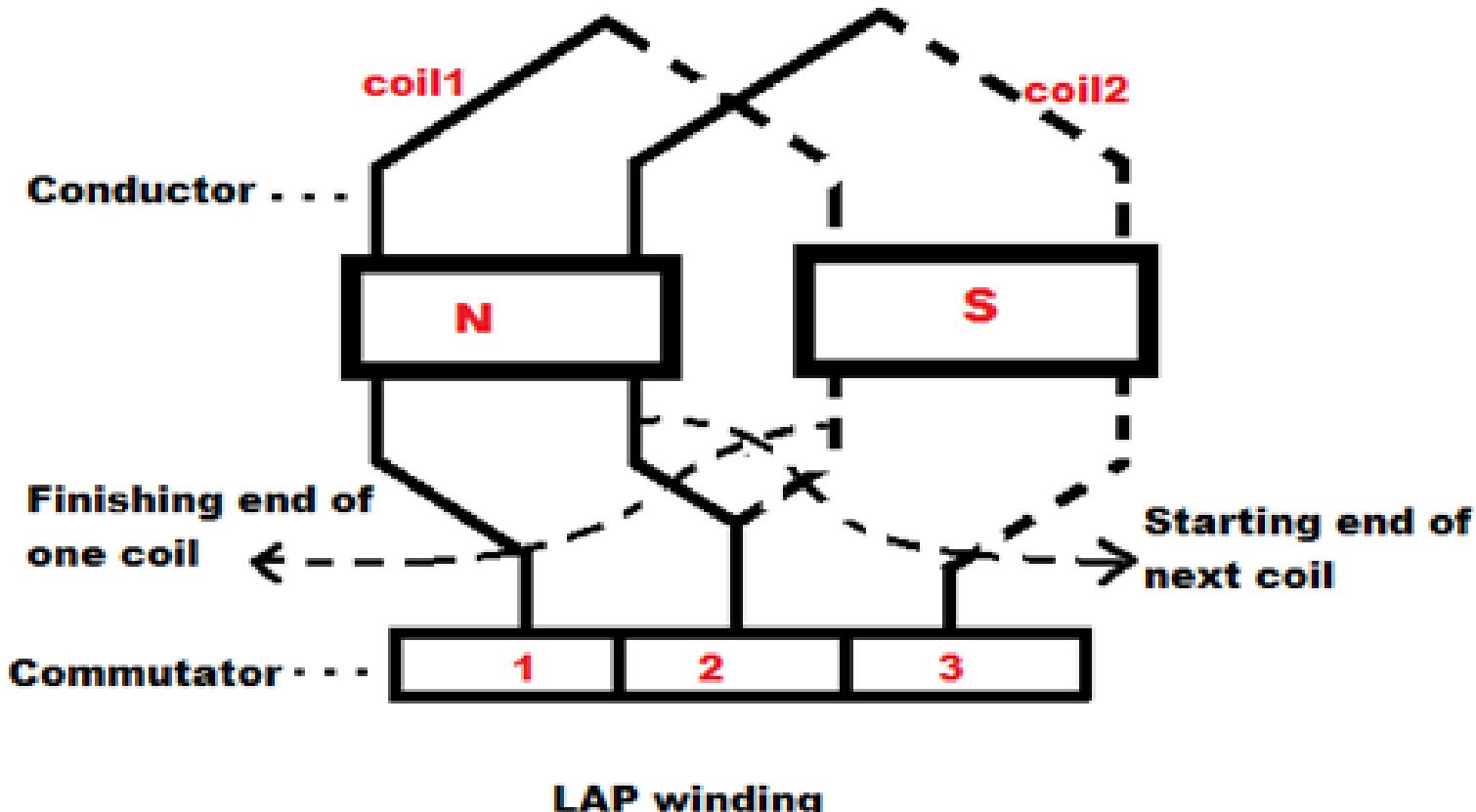
**Wave Winding**

The difference between these two is merely due to the end connections and commutator connections of the conductor.

It may be simplex, duplex or multiplex.

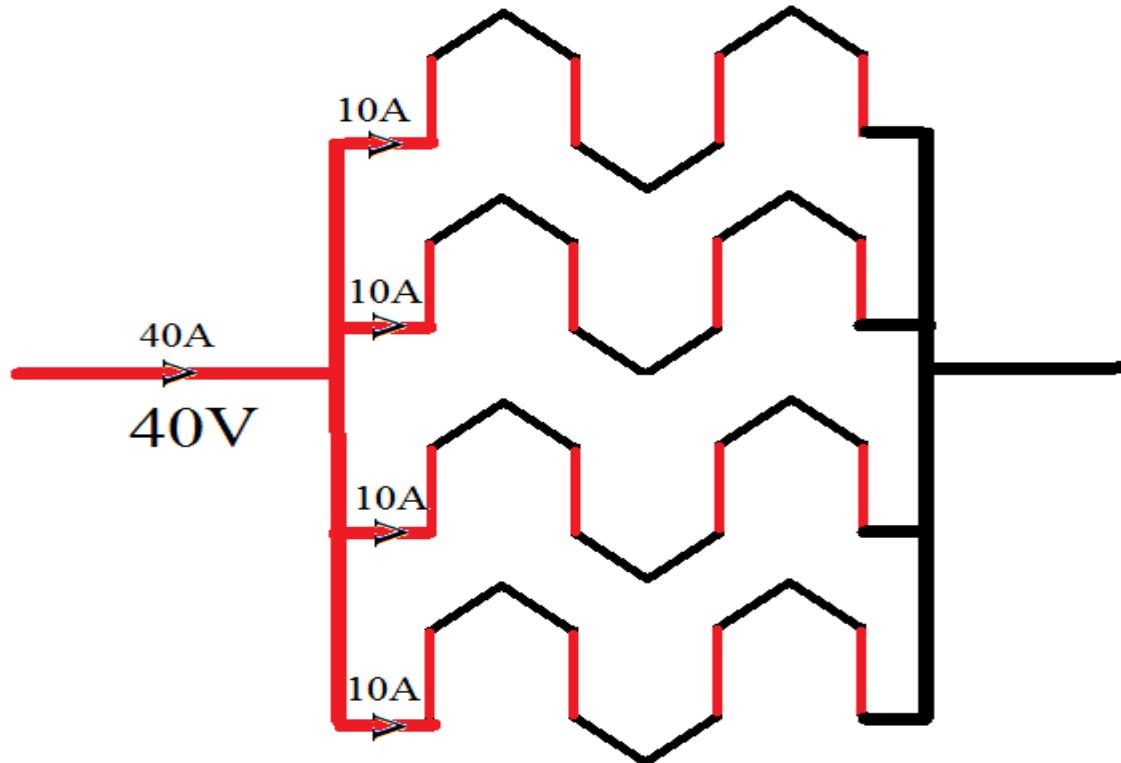
## Lap Winding

In a simplex lap winding, the two ends of a coil are connected to adjacent commutator segments.

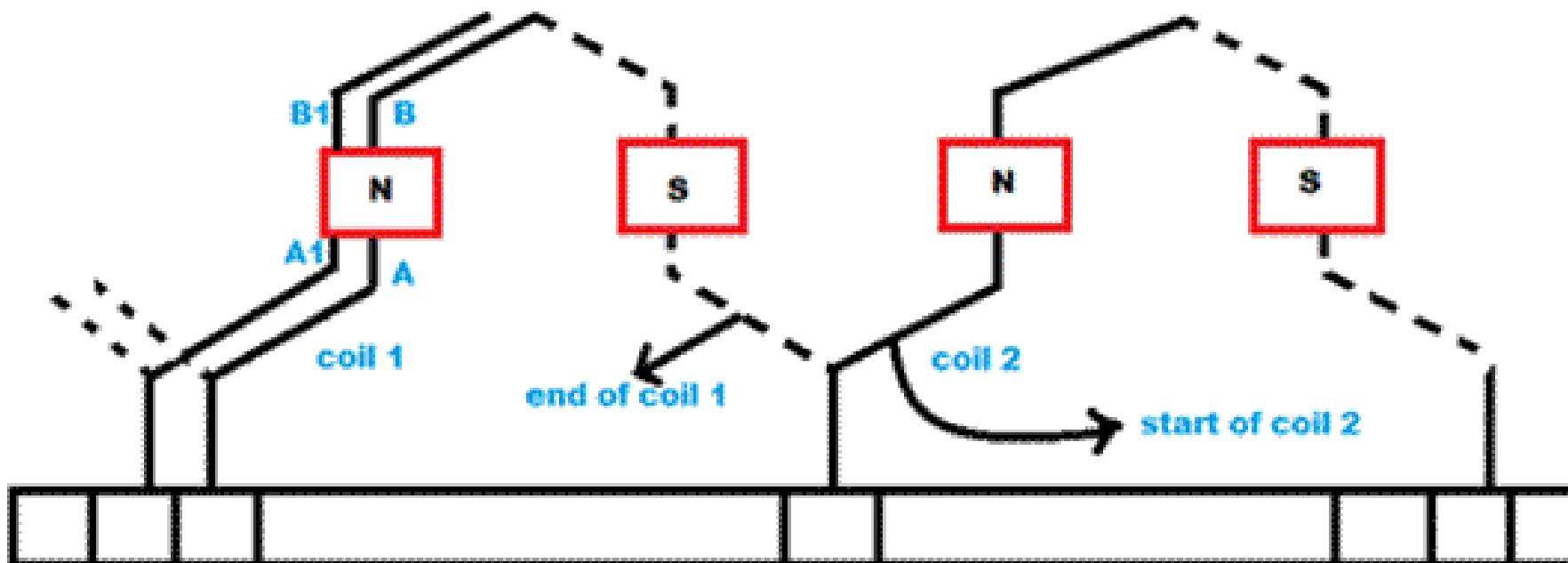


## Lap Winding

- No of parallel paths(A) is equal to the no of poles(P), (A=P).
- Let Z=16, P=4, V(per conductor)=10V, I(per conductor=10A)
- High current, low voltage

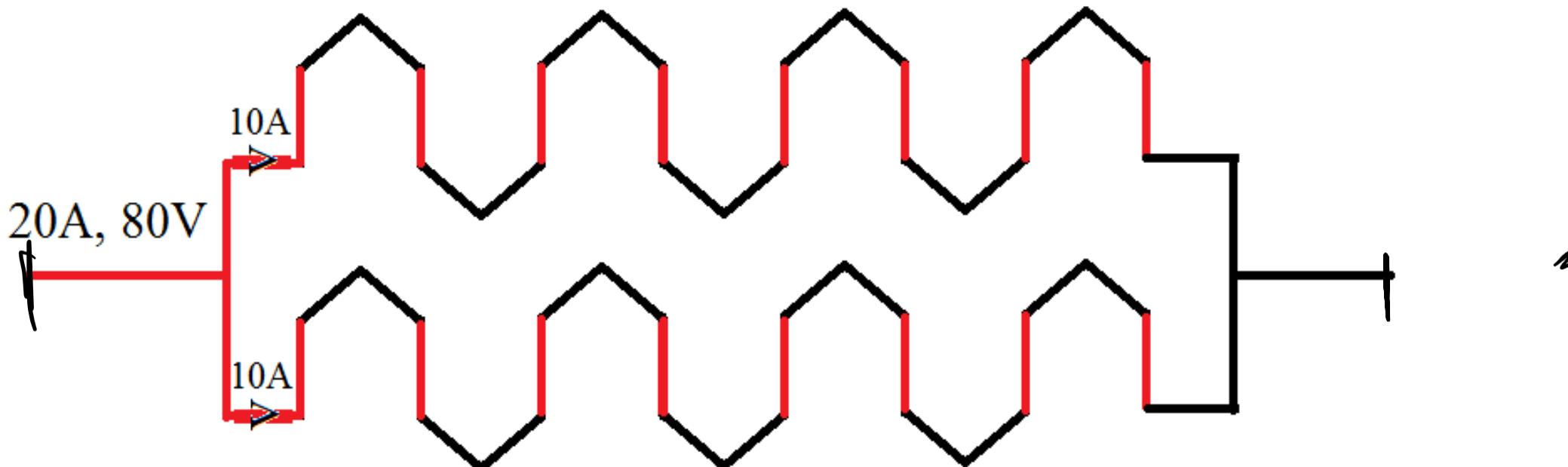


A conductor under one pole is connected at the back to a conductor which occupies an almost corresponding position under the next pole which is of opposite polarity.



wave winding

- No of parallel paths(A) is always equal to 2, ( $A=2$ )
- Let  $Z=16$ ,  $P=4$ ,  $V(\text{per conductor})=10V$ ,  $I(\text{per conductor})=10A$
- Low current, High voltage



### Text Book:

1. "Basic Electrical Engineering" S.K Bhattacharya, 1<sup>st</sup> Edition Pearson India Education Services Pvt. Ltd., 2017
2. "Basic Electrical Engineering", D. C. Kulshreshtha, 2<sup>nd</sup> Edition, McGraw-Hill. 2019
3. "Special Electrical Machines" E G Janardanan, PHI Learning Pvt. Ltd., 2014

### Reference Books:

1. "Engineering Circuit Analysis" William Hayt, Jack Kemmerly, Jamie Phillips and Steven Durbin, 10<sup>th</sup> Edition McGraw Hill, 2023
2. "Electrical and Electronic Technology" E. Hughes (Revised by J. Hiley, K. Brown & I.M Smith), 12<sup>th</sup> Edition, Pearson Education, 2016.



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**THANK YOU**

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**Jyothi T N**

Department of Electrical & Electronics Engineering

**jyothitn@pes.edu**