



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

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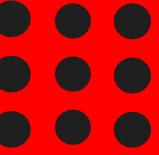
## **DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

### **COURSE NAME : 23EET01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

**I YEAR /II SEMESTER ARTIFICIAL INTELLIGENCE & DATA SCIENCE**

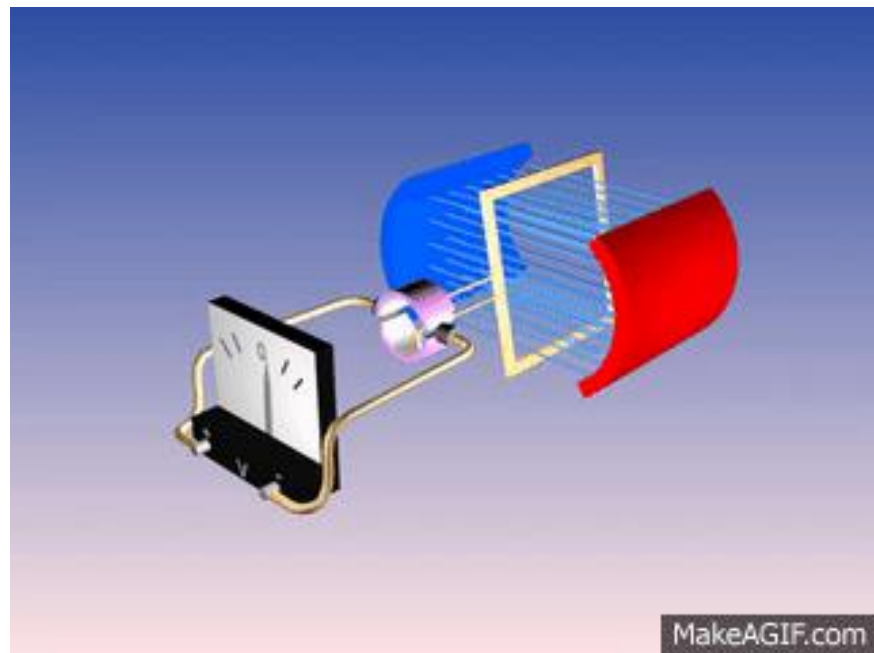
**Unit 1 – Electrical Machines**

**Working Principle of DC Machine**

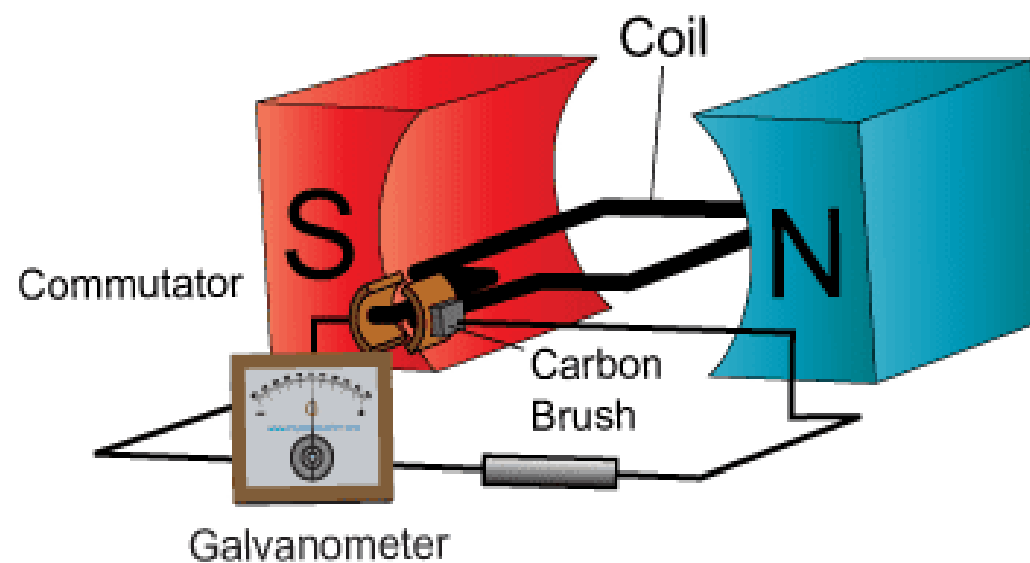




# FARADAYS LAW OF ELECTROMAGNETIC INDUCTION

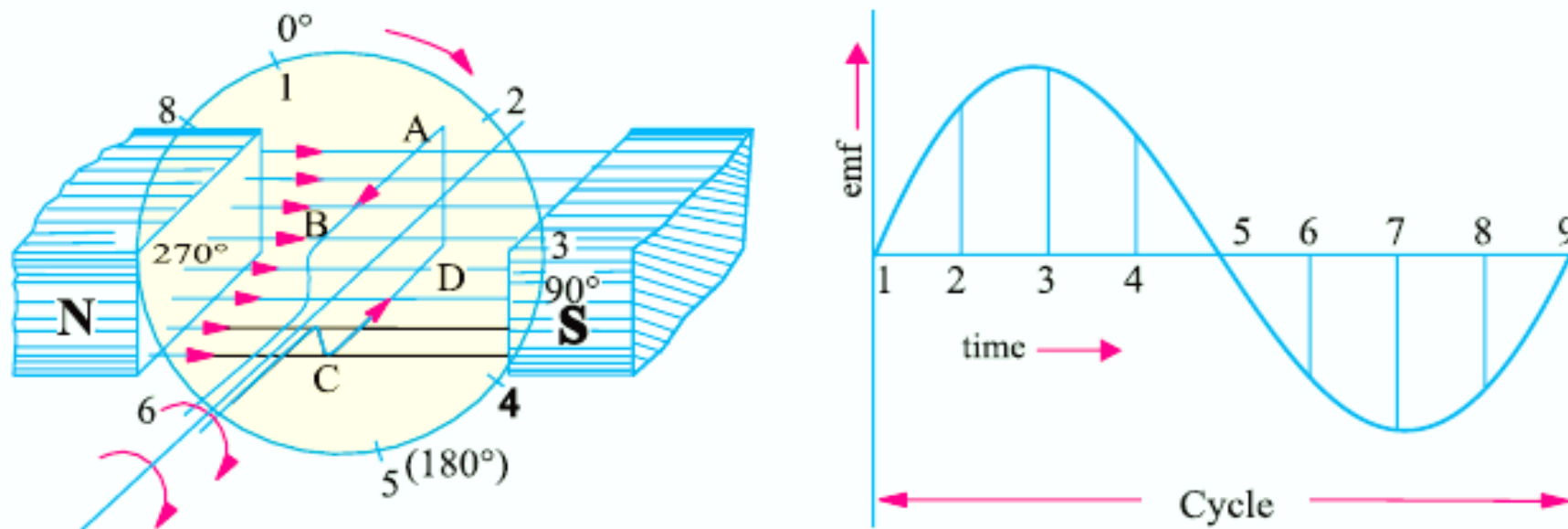
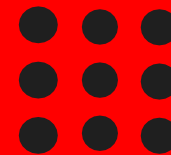


DC Generator Principle





# EMF GENERATION



Rate of change of flux ,  $e = d\Phi/dt$





# EMF EQUATION OF DC MACHINE

Let

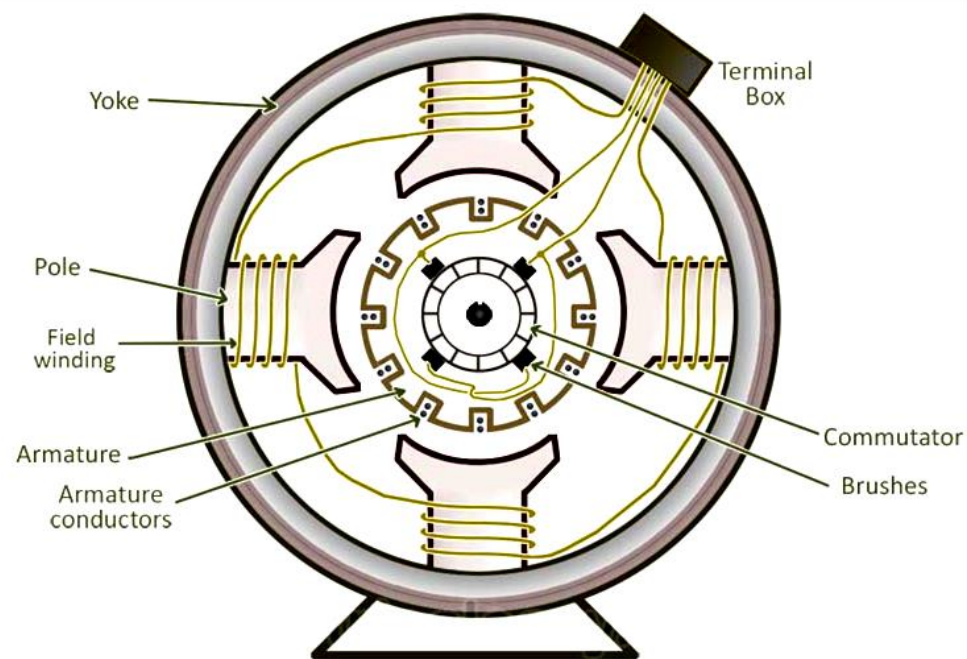
$P$  = no of poles

$Z$  = no of conductors distributed in the armature

$\Phi$  = flux produced by each pole in weber

$N$  = speed of the rotor in r.p.m

$A$  = no of parallel paths





# ASSESSMENT 1

1. Define Faradays Law of Electromagnetic Induction.

2. The EMF generated will be maximum when conductor angle is \_\_\_\_\_ and \_\_\_\_\_





# EMF EQUATION OF DC MACHINE

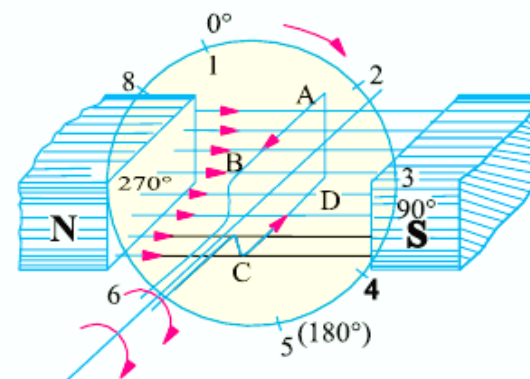
The induced emf within the armature conductors is according to the faraday law of electromagnetic induction.

where  $e$  = rate of change of flux ,  $e = d\Phi/dt$

Total flux produced ( $\Phi_T$ ) or ( $d\Phi$ ) = flux produced by individual pole \* no of poles

$$(\Phi_T) = \Phi * P$$

The time required for a conductor to complete one revolution ( $dT$ ) =  $60/N$





# EMF EQUATION OF DC MACHINE

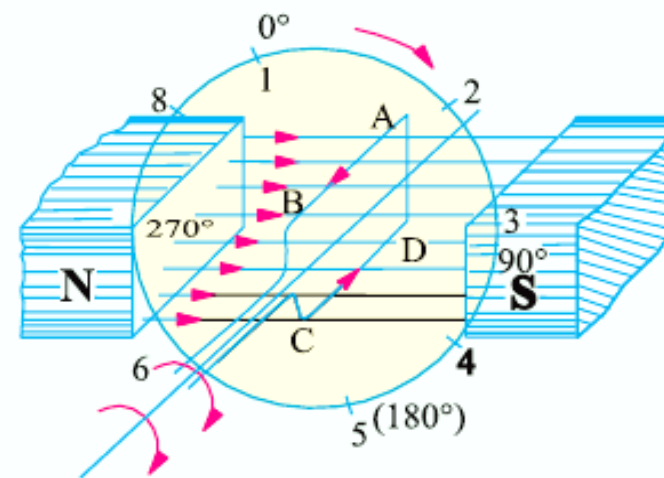
substituting these values in emf induced, we get

$$e = \Phi * P / 60/N$$

$$e = \Phi * P * N / 60 \text{ for one conductor}$$

$$e = \Phi * P * N * Z / 60 * A \text{ for 'Z' conductors for 'A' parallel paths}$$

Therefore, the EMF equation is given as  $e = \Phi * P * N * Z / 60 * A$





# Assessment 2

1. Write the emf equation of DC Generator
2. A 4 pole generator with wave wound armature has 51 slots each having 24 conductors. The flux per pole is 10 mWb. Speed of the generator is 750 rpm. Determine the Induced Emf







# REFERENCES

1. Bhattacharya. S.K, “Basic Electrical and Electronics Engineering”, Pearson Education , (2017)
2. Muthu Subramanian R, Salivahanan S,“ Basic Electrical and Electronics Engineering”, Tata McGraw Hill Publishers, (2009)
3. V.Mittle“ Basic Electrical Engineering”, Tata McGraw Hill Publishers, (2017)
4. Nagrath. I.J, “Electronics: Analog and Digital”, Prentice Hall India Pvt. Ltd., (2013)

## THANK YOU