SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

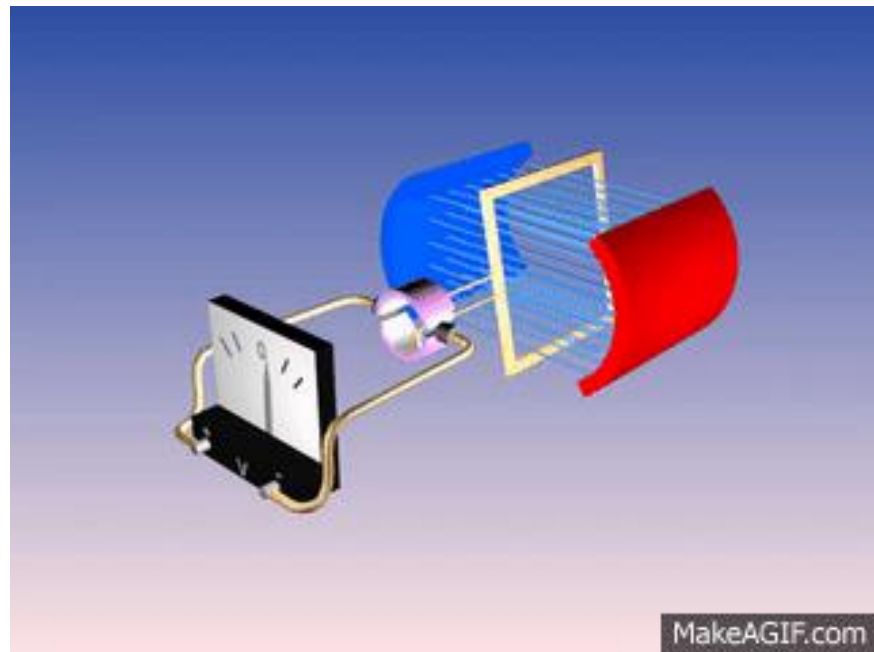COURSE NAME : 19EE01 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR /II SEMESTER MECH
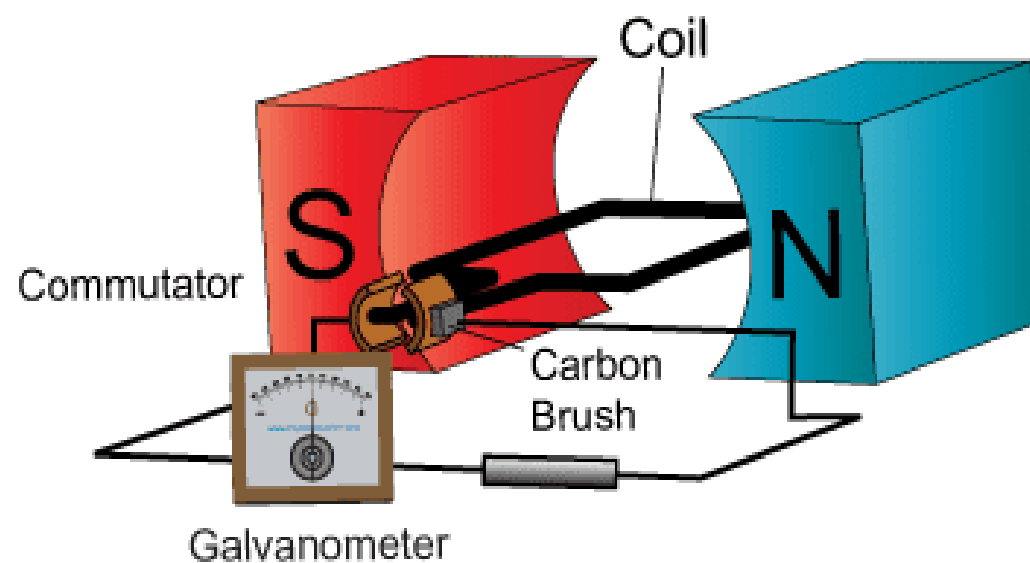
Unit 2 – Electrical Machines
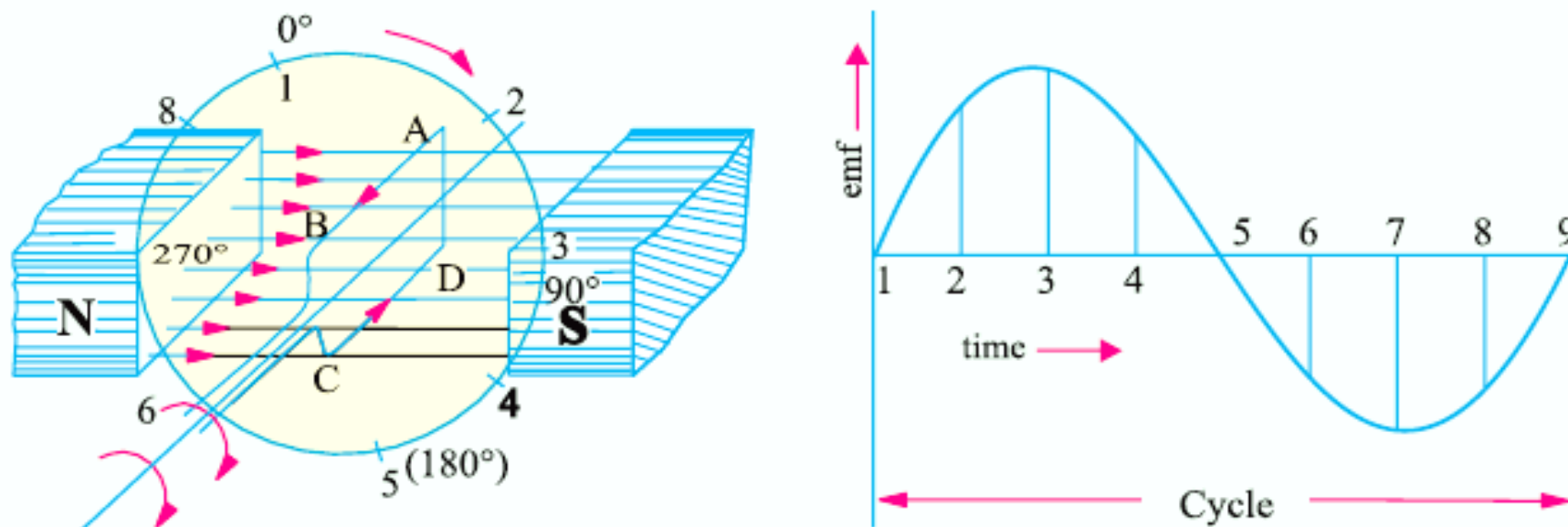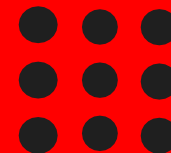
Working Principle of DC Machine

FARADAYS LAW OF ELECTROMAGNETIC INDUCTION

DC Generator Principle

EMF GENERATION

Rate of change of flux , e = dΦ/dt
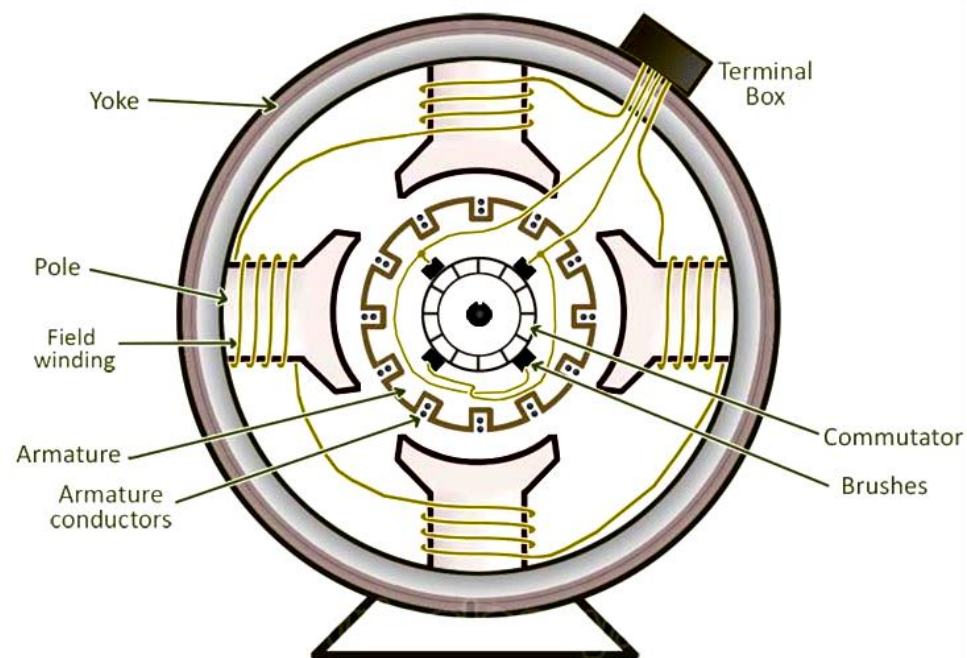
EMF EQUATION OF DC MACHINE

Let

P = no of poles

Z = no of conductors distributed in the armature

Φ = 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 _____
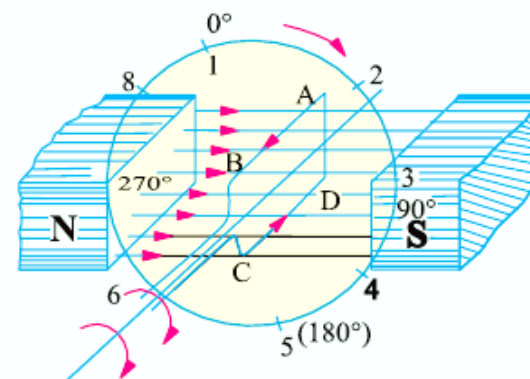
EMF EQUATION OF DC MACHINE

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 (Φ_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
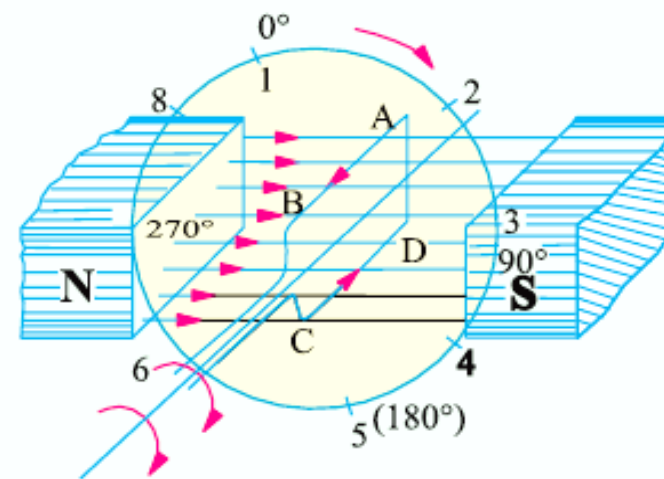
EMF EQUATION OF DC MACHINE

substituting these values in emf induced, we get

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

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

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