



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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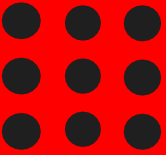
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 19EE308 ELECTRICAL ENGINEERING & INSTRUMENTATION

II YEAR /III SEMESTER ECE

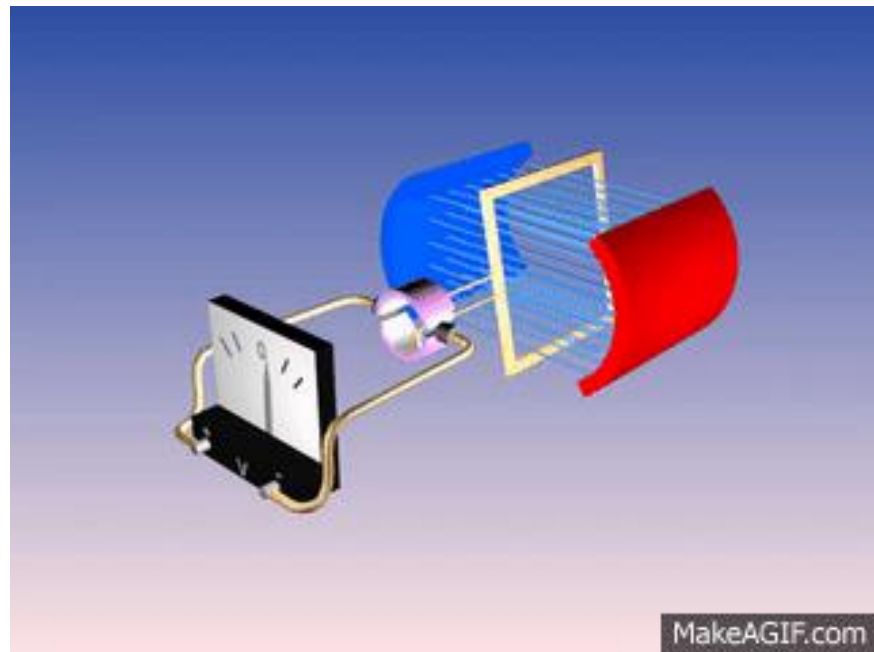
Unit 1 – DC MACHINES

Working Principle & EMF Equation of DC Generator

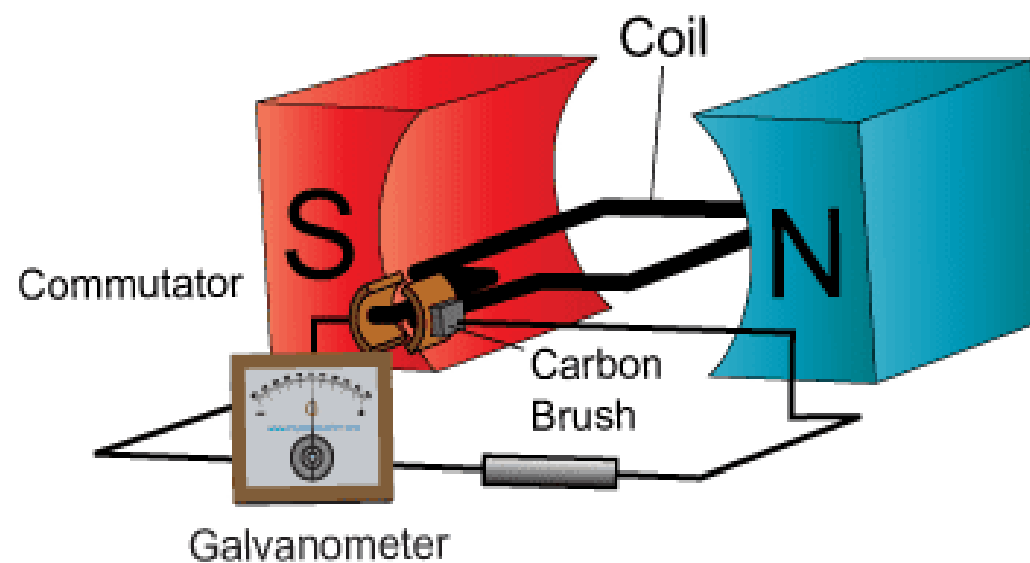




FARADAYS LAW OF ELECTROMAGNETIC INDUCTION

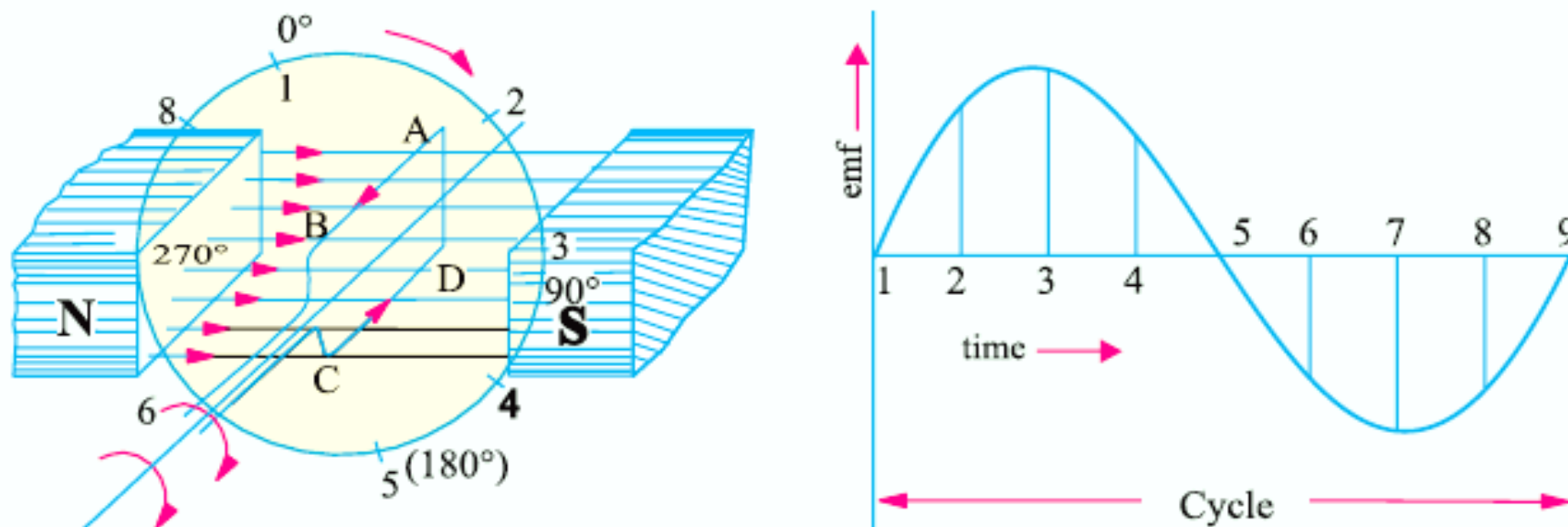
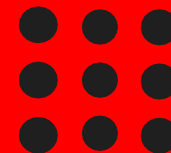


DC Generator Principle





EMF GENERATION



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





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

Let

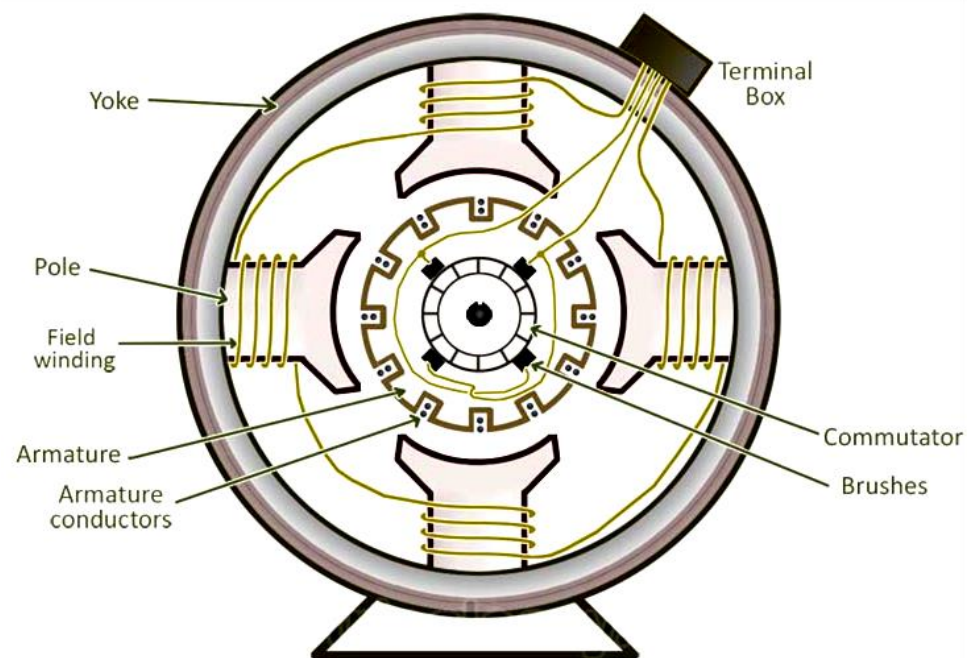
P = no of poles

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





EMF EQUATION OF DC MACHINE

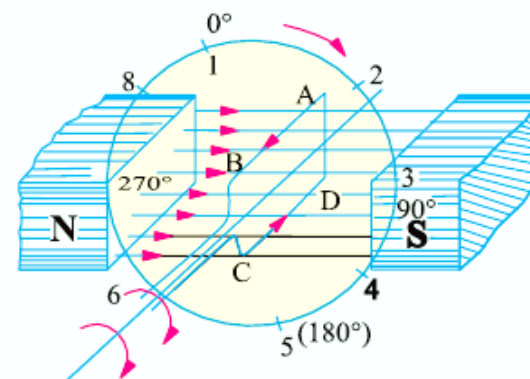
The induced emf within the armature conductors is according to the faraday law of electromagnetic induction.

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

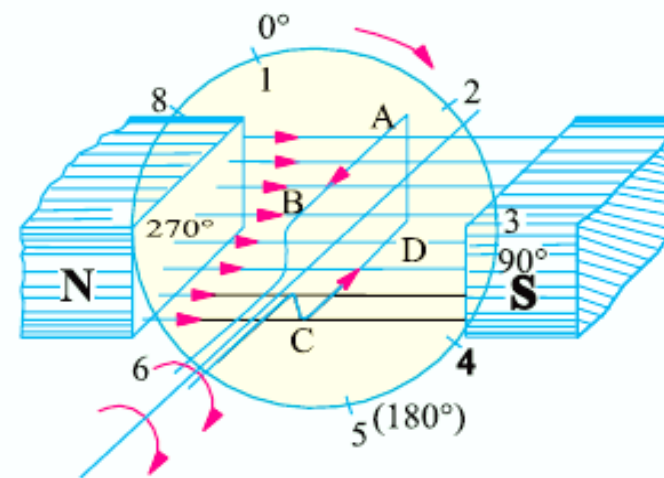
substituting these values in emf induced, we get

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

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

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

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