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 :BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
I YEAR / 01 SEMESTER MECHANICAL

Unit 2 – ELECTRICAL MACHINES

EMF equation of DC Motor

EMF EQUATION OF DC MOTOR

Let us Assume:

ϕ = Flux per pole in webers

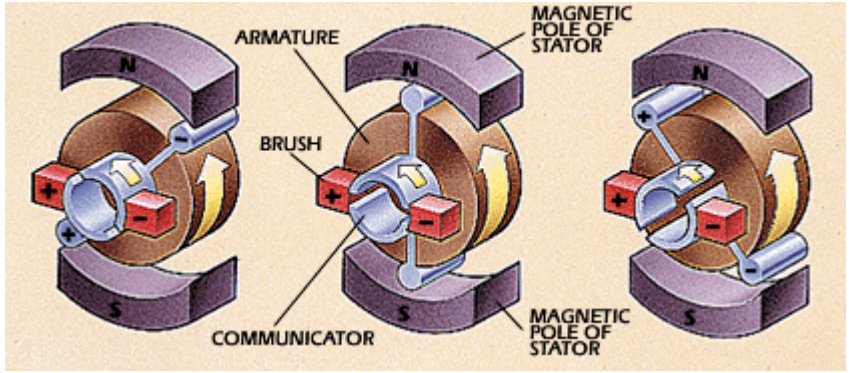
Z =Total number of armature conductors

N=Armature rotation in rpm

P=No of poles

A=No of parallel paths

E_g= e.m.f induced in any one of the parallel paths of armature



Average e.m. f generated per conductor = N dϕ / dt

Flux cut per conductor = ϕP webers

No. of revolutions per second = N/60

Time for one revolution = dt = 60/N

Rate of change of flux linkage = Flux cut per conductor/sec

dϕ / dt = (ϕP/60) / N = (ϕPN) / 60 wb/sec

Back emf generated per conductor per second
= (ϕPN) / 60 volts

EMF generated for Z conductors = (ϕPNZ) / 60volts

No. of parallel paths = A

For lap winding, A = P

For wave winding, A = 2

$\therefore$ back e. m. f, E = (ϕNZP) / (60*A)volts

ASSESSMENT

1. What are the units for magnetic flux?

(a) volts

(b) ohms

(c) webers

(d) poles

2. What do you mean by RPM?

- (a) Returns per month
- (b) Revolutions per minute
- (c) Rotations per month
- (d) None

REFERENCES

1. Murugesh Kumar K, “Electric Machines Vol I”, Vikas Publishing Pvt Ltd , (2010)
2. Gupta J.B,“ Theory and Performance of Electrical Machines”, S.K.Kataria and Sons, (2002)
3. Kothari D.P and Nagrath I.J“ Electric Machines”, Tata McGraw Hill Publishers, (2002)
4. Bhimbhra P.S., “Electrical Machinery”, Khanna Publishers, (2003)

THANK YOU