



# 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 : 19EE504 SPECIAL ELECTRICAL MACHINES

III YEAR / Vth SEMESTER EEE

Unit 1 - PMBLDC

By

Dr. C. Udhaya Shankar ASP / EEE & Senior Innovator / I-HUB

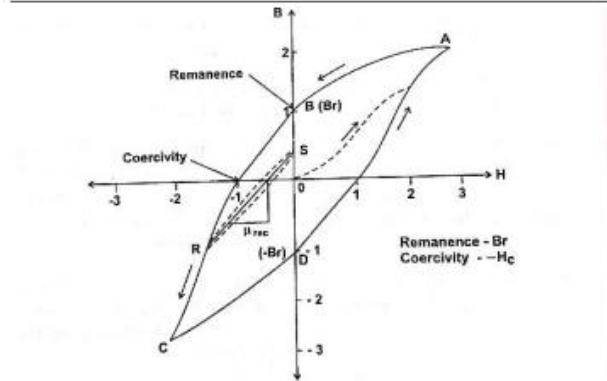
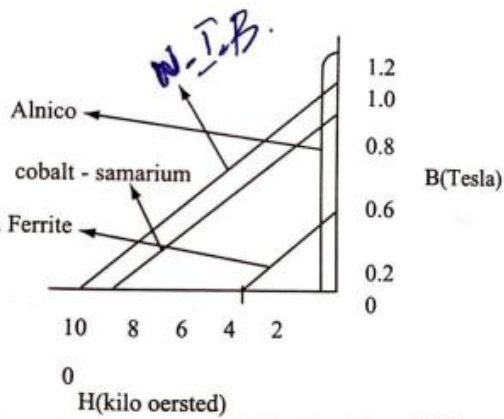
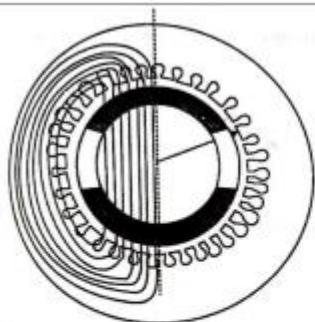


Fig. 5.9: B-H hysteresis loop of hard permanent magnet material



(a) Motor cross section and flux pattern (b) Magnet demagnetization  
Fig. 5.32: Magnetic circuit analysis of BLDC motor

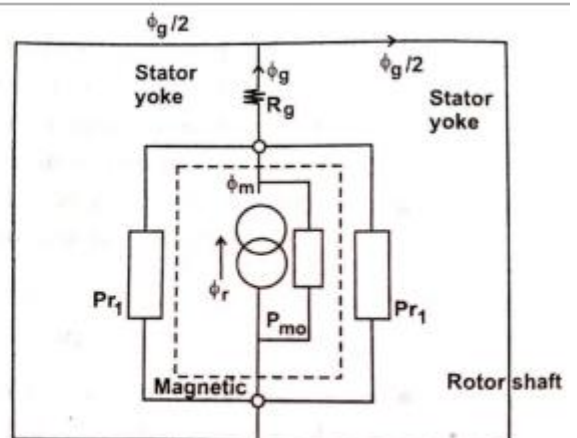
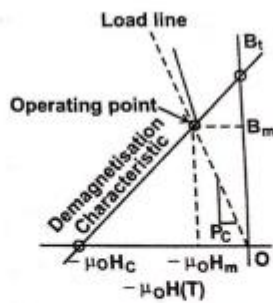
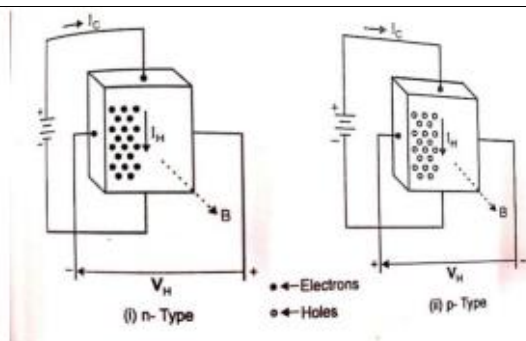
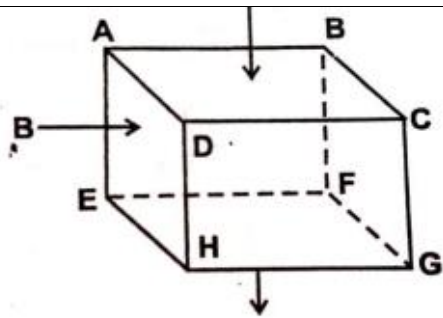


Fig. 5.33: Magnetic equivalent circuit.



**Fig. 5.37: Hall effect**

The magnitude of the electro motive force  $V_H$ , which is called the Hall voltage, is given by the  $V_H = \frac{1}{d} B I_c R_H$

where  $R_H \rightarrow$  is the Hall constant ( $m^3 C^{-1}$ )

$I_c \rightarrow$  electrical current (A)

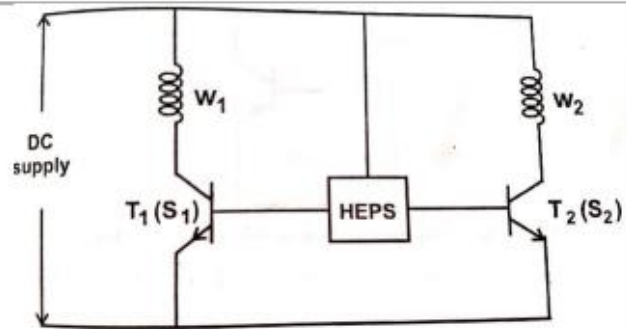
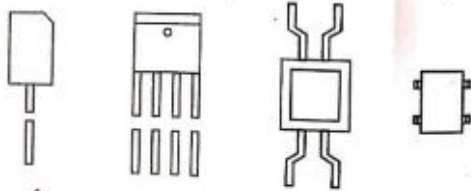
$B \rightarrow$  flux density (T)

$d \rightarrow$  thickness of the semiconductor pellet (m)

This phenomenon was discovered by E.H. Hall in 1878 from an experiment using a metal segment and is called the "Hall effect".

Semiconductor devices which are made for use in detecting magnetic fields are called "Hall elements (or) Hall generators".

*Example:* InSb (indium - antimony), GaAs (gallium - arsenide)



**Fig. 5.39: Driving circuit for 2 pole motor**