11 September 2011

Saturday 03

Day (246-119) • Week 36

MAGNETIC CIRCUITS

The area around a magnet is called the magnetic field and it is in this area that the effects of the magnetic force produced by the magnet can be detected.

Electromagnetic system :→ It is an essential element of all rotating electric machines and electromechanical devices as well as static devices like transformers.

Magnetic field :→ coupling medium allowing interchange and energy in either direction between electrical and mechanical systems.

MAGNITIC EFFECTS OF ELECTRIC CURRENT

Sunday 04

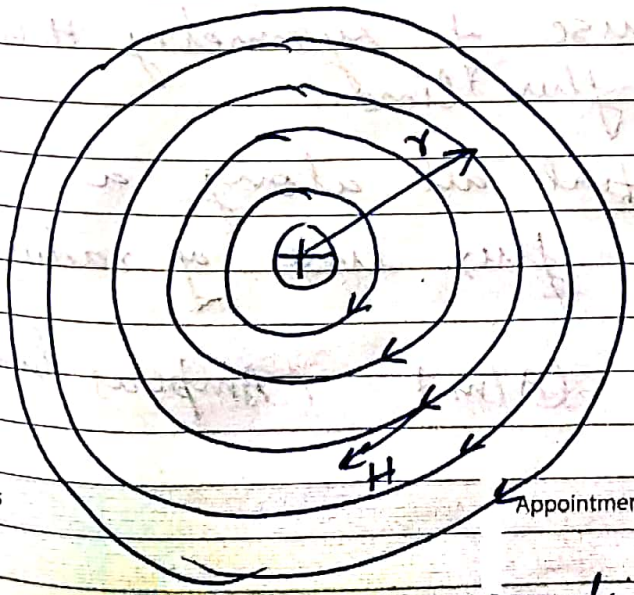

fig. flux surrounding current

H = Magnetic intensity or Magnetizing force

$l = 2\pi r$

$H = \frac{I}{2\pi r}$ A/m

Notes

Appointment

October'11

Monday	31	3	10	17	24
Tuesday		4	11	18	25
Wednesday		5	12	19	26
Thursday		6	13	20	27
Friday		7	14	21	28
Saturday	1	8	15	22	29
Sunday	2	9	16	23	30

A long straight conductor carrying current (into the plane of paper). the current causes a magnetic field to be established in the space surrounding it.

A line of flux is a closed path around the current such that the magnetic force is tangential to it all points around the line.

The direction of flux is given by the right hand rule, which states that if the conductor is grasped by the right hand such that the thumb points in the direction of current, the flux is established in the direction in which the fingers curl.

H ⇒ defined as the causative current per unit length of flux line enclosing the current.

In this case, because of symmetry H is uniform along each flux line.

Since, H is tangential all along a flux line, for any flux line of radius r,

$$H = \frac{I}{2\pi r} \quad (A/m) \quad (\text{Amperes law})$$

The flux density B is established by the field intensity is a property of the medium.

for air, or any non-magnetic medium, the ratio of magnetic flux density to magnetizing force is a constant.

i.e B/H = constant.

this constant is μ_0, the permibility of free space (or the magnetic space constant) and

$$\mu_0 = 4\pi \times 10^{-7} \text{ wb/A-m or H/m}$$

$$\therefore \boxed{B = \mu_0 H \text{ wb/m}^2 \text{ or Tesla}}$$

for all media other than free space

$$\boxed{B = \mu_0 \mu_r \cdot H}$$

where μ_r is the relative permeability and is defined as

$$\mu_r = \frac{\text{flux density in material}}{\text{flux density in a vacuum}}$$

μ_r varies with the type of magnetic material and since it is a ratio of flux density it has no unit.

Also we can write,

$$\boxed{B = \mu \cdot H}$$

Notes Appointment

2011

07 Wednesday September '20

Day (250-115) • Week 37

where $\mu = \mu_0 \mu_r$ = absolute permeability

The flux passing through the area (A)
(for uniform flux density)

$$\boxed{\phi = B \cdot A \cdot} \quad Wb$$