Chapter 12 – Quick Revision Sheet

Magnetic Effects of Electric Current

Magnetic Field

Magnetic field is the region around a magnet or current-carrying conductor where its effect is felt.

Key Points:

- Compass needle deflects in magnetic field
- Represented using magnetic field lines

Properties of Magnetic Field Lines:

- Outside magnet: North → South
- Inside magnet: South → North
- Form closed loops
- Closer lines = stronger field
- Never intersect

Magnetic Field due to Straight Conductor

Observation:

- Field lines are concentric circles
- Center = wire

Important Points:

- Field $\propto$ Current $\uparrow$
- Field $\propto$ 1 / Distance $\downarrow$

Magnetic Field due to Circular Loop

Key Points:

- Each loop produces magnetic field
- At center → strong field
- Field lines become straight near center

Important:

- More turns → stronger field

Magnetic Field due to Solenoid

Solenoid = coil of many circular turns

Properties:

- Acts like bar magnet
- Has North & South poles
- Inside field is uniform

Force on Current-Carrying Conductor

When placed in magnetic field → conductor experiences force

Depends on:

- Current
- Magnetic field
- Length of conductor

Maximum Force:

- When conductor ⍰ magnetic field

Electric Power

Definition:

Electric power is the rate at which electrical energy is consumed.

$$P = VI$$

Other Forms:

- $P = I^2R$
- $P = V^2/R$

Unit: Watt (W)

Direct Current (DC)

Current flows in one direction

Examples: • Cell • Battery

Alternating Current (AC)

Current changes direction periodically

Frequency:

- Number of cycles per second
- In India → **50 Hz**