- Magnet: (i) is an object that attracts objects made of iron, cobalt & nickel.
  (ii) Comes to rest in North-South direction, when suspended freely.

- Magnets are used: (i) In radio & stereo speakers, (ii) In refrigerator doors, (iii) on audio & video cassettes players, (iv) On hard discs & floppies of computers & (v) in children's toys.

- Magnetic field: The area around a magnet where a magnetic force is experienced is called a magnetic field. It is a quantity that has both direction & magnitude.

- Magnetic field lines: Magnetic field is represented by field lines. They are lines drawn in a Magnetic field along which a North magnetic pole moves. Magnetic field lines are called as Magnetic lines of force.
  Refer to figure 13.3 & 13.4 page no. 225 of N.C.E.R.T Text book)

- Properties of Magnetic field lines:
  (i) They do not intersect each other.
  (ii) It is taken by convention that magnetic field lines emerge from North pole and merge at the South pole. Inside the magnet, their direction is from South pole to North pole. Therefore magnetic field lines are closed curves.
- Magnetic field lines due to a current through a straight conductor (wire)- consist of series of concentric circles whose direction is given by the Right hand thumb rule.
- Right hand thumb rule: If a current carrying straight conductor is held in your right hand such that the thumb points towards the direction of current, then the wrapped fingers show the direction of magnetic field lines.
  (Refer to figure 13.7, page no. 228 of N.C.E.R.T Text book)
- Magnetic field lines due to a current through a circular loop
  (Refer to figure 13.8, page no. 228 of N.C.E.R.T Text book)
- The strength of the magnetic field at the centre of the loop(coil)depends on:
  (i) The radius of the coil- The strength of the magnetic field is inversely proportional to the radius of the coil. If the radius increases, the magnetic strength at the centre decreases.
  (ii) The number of turns in the coil: As the number of turns in the coil increase, the magnetic strength at the centre increases, because the current in each circular turn is having the same direction, thus the field due to each turn adds up.
  (iii) The strength of the current flowing in the coil: as the strength of the current increases, the strength of thee magnetic fields also increases.

- Solenoid: (Refer to figure 13.10, page no. 229 of N.C.E.R.T Text book)
- (i) A coil of many turns of insulated copper wire wrapped in the shape of a cylinder is called a Solenoid.
  (ii) Magnetic field produced by a Solenoid is similar to a bar magnet.
  (iii) The strength of magnetic field is proportional to the number of turns & magnitude of current.

(Refer to figure 13.11, page no. 229 of N.C.E.R.T Text book)

- Fleming's Left hand rule: Stretch the thumb, forefinger and middle finger of left hand such that they are mutually perpendicular. Forefinger points in the direction of magnetic field and centre finger in the direction of current, then the thumb gives the direction of force acting on the conductor.
  (Refer to figure13.13, page no. 231 13.13 of N.C.E.R.T Text book)

- Electric motor: A device that converts electric energy to mechanical energy.
  (Refer to figure 13.15, page no. 232 of N.C.E.R.T Text book)

- Principle of Electric motor: When a rectangular coil is placed in a magnetic field and a current is passed through it, force acts on the coil, which rotates it continuously. With the rotation of the coil, the shaft attached to it also rotates.

- Electromagnetic induction: Electricity production as a result of magnetism (induced current) is called Electromagnetic induction.

- Fleming's Right hand rule: gives the direction of induced current.
  Stretch the thumb, forefinger and middle finger of right hand such that they are mutually perpendicular. Forefinger points in the direction of magnetic field and centre finger in the direction of induced current, then the thumb gives the direction of motion of the conductor.

- Electric generator: A devise that converts mechanical energy to electric energy.
  (Refer to figure 13.19, page no. 236 of N.C.E.R.T Text book)
  Electric generator is of two types- (i) A.C generator (ii) D. C generator

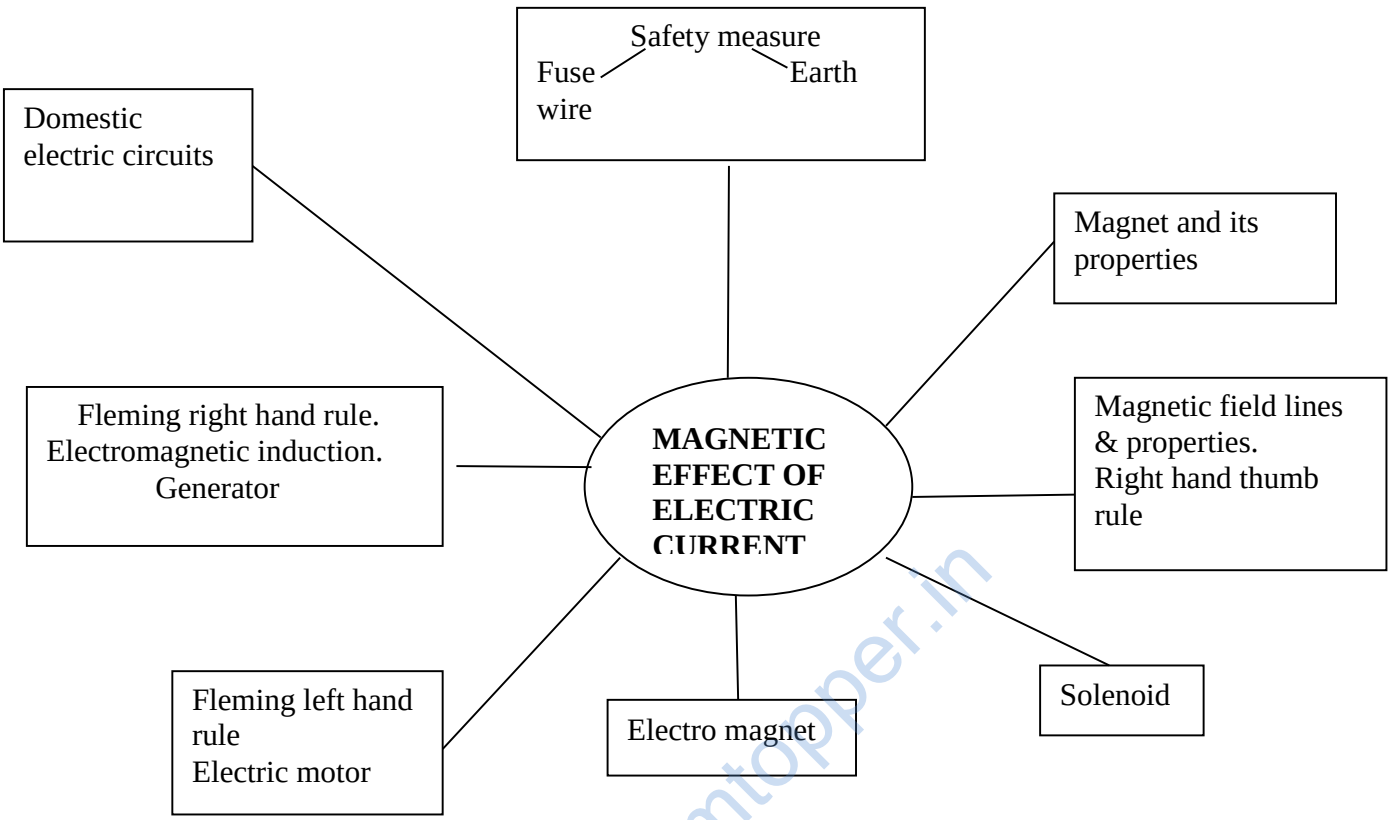
- Principle of Electric generator: Electromagnetic induction

- Domestic electric circuits: (Refer to figure 13.20, page 238 of N.C.E.R.T Text book)
- We receive electric supply through mains supported through the poles or cables. In our houses we receive AC electric power of 220V with a frequency of 50Hz.
  The 3 wires are as follows- (i) Live wire- (Red insulated, Positive)
  (ii) Neutral wire- (Black insulated, Negative)
  (iii) Earth wire- (Green insulated) for safety measure to ensure that any leakage of current to a metallic body does not give any serious shock to a user.
- Short circuit: is caused by touching of live wires and neutral wire
- Fuse: is a protective device used for protecting the circuits from short circuiting and over loading
- **Important diagrams-**

1. Magnetic field lines around a bar magnet.
2. Right hand thumb rule
3. Magnetic field lines through and around a current carrying solenoid.
4. An electromagnet.
5. A simple electric motor
6. Electric generator

2. Direction of electric current in a simple electric circuit.
3. Direction of Magnetic field lines depends on the direction of electric current.

MIND MAP



FORMATIVE ASSESSMENT I
Q. PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. State two uses of electromagnet.

2. An electron moving along X – axis in a magnetic field along Y – axis. In which direction will the electron deflected.

4. What is the importance of earth wire?

5. Should a copper wire be used as a fuse wire? If not, why?

6. Give two points of difference between and electromagnet and permanent magnet.

7. Draw the lines of force indicating field direction of the magnetic field through and around
   i) Single loop of wire carrying electric current.
   ii) A solenoid carrying electric current.

8. What id magnetic field? How is the direction of magnetic field at a point determined?

9. Give four features of domestic electric wiring.

10. Draw a schematic diagram of domestic wiring system and write its main features.

11. Match the following:

A	B
i) Right hand thumb rule	a) Force on a conductor in a magnetic field
ii) Fleming's left hand rule	b) Direction of magnetic field of straight conductor
iii) Fleming's right hand rule	c) Direction of induced current in conductor
	d) Polarity of any end of a solenoid.

12. a) Draw a labelled diagram to show how electro – magnet is made.
    b) What is the purpose of soft iron core in making electromagnet?

13. Write two differences between AC and DC current and draw diagram also.

14. a) Write principle of electric generator.
    b) Explain construction and working of generator.
    c) Draw labelled diagram of electric generator.

HOTS QUESTIONS (SOLVED)

1. On what effect of an electric current does an electromagnet work?

A. Magnetic effect of electric current

2. What is the frequency of AC (Alternating Current) in India?

A. 50Hz

3. On what effect of an electric current does a fuse work?

A. Heating effect of electric current

HOTS QUESTIONS (UNSOLVED)

1. Name the sources of direct current.
2. Why don't two magnetic lines intersect each other?
3. What is the role of split ring in an electric motor?
4. What is an earth wire?

ORAL QUESTIONS

1. a) What are magnets?
   b) What are natural magnets?
   c) What is the meaning of the word lodestone?
   d) What is the origin of the word magnetism?

2. a) State the law of magnetic poles.
   b) What is the surer test of magnetism?
   c) What happens if we break a magnet into two pieces?
   d) Is it possible to obtain isolated north and south poles?

3. a) What is magnetic line of force?
   b) Can two magnetic lines of force intersect? Give reason.
   c) Magnetic lines of force are endless. Comment.
   d) How do the field lines of the regions of strong field different from those of weak field?

4. a) What is a solenoid?
   b) Is the magnetic field of a solenoid similar to that of a bar magnet?
   c) State the two factors by which the strength of magnetic field inside a solenoid can be increased.
   d) How will you determine the direction of the magnetic field due to a current – carrying solenoid?

5. a) What is an electromagnet?
   b) What is the effect of placing an iron core in a solenoid?
   c) What type of core should be used inside a solenoid to make an electromagnet?
   d) Give two advantages of electromagnets.

ORAL QUESTIONS

1. What important observation did Oersted make in his experiments with current carrying conductors?

2. How can you locate a current – carrying wire concealed in a wall?

3. A freely suspended magnet always points along north – south direction. Why?

4. What type of core should be used inside a solenoid to make an electromagnet?