Chapter- (Magnetic Effects of Electric Current)

Topic – 1(Magnetic Effects of Electric Current)

Very Short Answer Type Questions

Q.1. What is meant by magnetic field?

Q.2. Define magnetic field of bar magnet.

Q.3. Define the term 'induced current'.

Q.4. Why are magnetic field lines more crowded towards the pole of a magnet?

Q.5. Why does a compass needle show deflection when brought near a current carrying counductor?

Q.6. When a current carrying conductor is kept in a magnetic field, state the position when maximum force acts on it.

Q.7. Name the physical quantities which are indicated by the direction of thumb and forefinger in the Fleming's right hand rule.

Q.8. The magnetic field in a given region is uniform. Draw a diagram to represent it.

Q.9. State the observation made by Oersted on the basis of his experiment with current carrying conductors.

Q.10. State the effect on the strength of magnetic field produced at a point near a straight conductor if the electric current flowing through it increases

Q.11. State the effect of a magnetic field on the path of a moving charged particle.

Q.12. State the conclusions that can be drawn from the observation that a current carrying wire deflects a magnetic needle placed near it.

Q.13. Mention the angle between a current carrying conductor and magnetic field for which the force experienced by this current carrying conductor placed in magnetic field is largest.

Q.14. List two sources of magnetic fields.

Q.15. Suggest one way of discriminating a wire carrying current from a wire carrying no current.

Q.16. A straight wire carrying electric current is moving out of plane of paper and is perpendicular to it. What is the direction and type of induced magnetic field?

Q.17. How can it be shown that magnetic field exists around a wire carrying current?

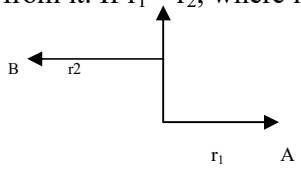
Q.18. How will the magnetic field intensity at the centre of a circular coil carrying current change, if the current through the coil is doubled and the radius of the coil is halved?

Short Answer Type Questions-I

Q.1. Name and state the rule which determine the direction of magnetic field around a straight current carrying conductor.

Q.2. State Right Hand Thumb Rule and also draw diagram.

Q.3. PQ is a current carrying conductor producing magnetic field around it. A and B are two points at a distance r_1 and r_2 from it. If $r_1 > r_2$, where is the magnetic strength greater and why?



Q.4. The given magnet is divided into three parts A, B and C.

Name the parts where the strength of the magnetic field is:

(i) Maximum (ii) Minimum

How will the density of magnetic field lines differ at these parts?

Q.5. When a current carrying conductor is kept in a magnetic field, it experiences a force. List the factors on which direction of this force depends.

Q.6. Draw magnetic field lines produced around a current carrying straight conductor passing through cardboard. How will the strength of the magnetic field change, when the point where magnetic field is to be determined, is moved away from the straight wire carrying constant current? Justify your answer.

Q.7. A current carrying conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving:

(i) electrons (ii) neutrons

Justify your answer.

Q.8. (i) Two magnets are lying side by side as shown below. Draw magnetic field line between poles P and Q.

(ii) What does the degree of closeness of magnetic field lines near the poles signify?

Q.9. PQ is a current carrying conductor in the plane of the paper as shown in the fig. Mention the direction of magnetic fields produced by it at points A and B.

Given: $r_1 > r_2$, where will the strength of the magnetic field be larger? Justify your answer in each case.

Q.10. In the experiment to show that a current carrying conductor when placed in the uniform magnetic field experiences a force. What happens when:
(i) You reverse the terminals of the battery?
(ii) The direction of current is perpendicular to the direction of magnetic field? State your observation.

Q.11. A compass needle is placed near a current carrying wire. State your observation for the following cases, and give reason for the same in each case:
(i) Magnitude of electric current in the wire is increased.
(ii) The compass needle is displaced away from the wire.

Q.12 (a) Write the special name given to the coil AB which has many circular turns of insulated copper wire.

(b) List two factors on which the strength of the magnetic field produced by AB depends.

Short Answer Type Questions-II

Q.1. What is meant by solenoid? How does a current carrying solenoid behave? Give its main use.

Q.2. What is solenoid? Draw the field lines of the magnetic field produced on passing current through and around a current carrying solenoid.

Q.3. What is an electromagnet? How can we determine north and south pole of an electromagnet with the help of magnetized iron bar.

Q.4. (i) What is meant by a magnetic field? Mention two parameters that are necessary to describe it completely.
(ii) If field lines of a magnetic field are crossed at a point, what does it indicate?

Q.5. What does the magnetic field pattern inside the solenoid indicate? State how this field be utilized to make an electromagnet. List two ways by which strength of this magnet can be increased.

Q.6. Name, state and explain with an example the rule used to determine the direction of force experienced by a current carrying conductor placed in a uniform magnetic field.

Q.7. Can a freely suspended current carrying solenoid stay in any direction? Justify your answer. What will happen when the direction of current in the solenoid is reversed? Explain.

Q.8. List the factors on which the magnetic field produced by a current carrying straight conductor depends. State the rule which gives the direction of its magnetic field. Draw the pattern of magnetic field lines due to a straight current carrying conductor.

Q.9. State the explain Fleming's right hand rule for the direction of induced current.

Q.10. Draw a diagram to show the magnetic field lines around a bar magnet. List any two properties of magnetic field lines.

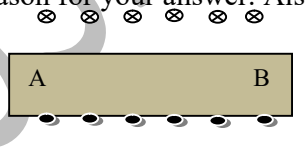
Q.11. Explain briefly two different ways to induce current in a coil. State the rule which determines the direction of induced current.

Q.12. Explain the magnetic effects of current with the help of an activity along with labelled diagram.

Q.13. You are given a strong bar magnet and a magnet compass needle. Describe an activity by which the magnetic field lines due to the bar magnet can be drawn.

Q.14. A coil of insulated wire is connected to a galvanometer. Explain what happens if a bar magnet with its north pole towards one face of the coil:
(i) moved quickly towards the coil.
(ii) Kept stationary inside the coil.
(iii) moved quickly away from the coil.

Q.15. Diagram shows lengthwise 2 section of a current carrying solenoid. X indicates current entering into the page, and e indicates current emerging out of the page. Decide which end of the solenoid A or B, will behave as north pole. Give reason for your answer. Also draw field lines inside the solenoid.



Q.16. Explain whether an alpha particle will experience any force in a magnetic field if:
(i) it is placed in the field at rest.
(ii) it moves in the magnetic field parallel to field lines.
(iii) it moves in the magnetic field perpendicular to field lines.

Q.17. Find the direction of magnetic field due to a current carrying circular coil held:
(i) Vertically in North-South plane and an observer looking it from east sees the current to flow in anticlockwise direction.
(ii) Vertically in East-West plane and an observer looking it from south sees the current to flow in

anticlockwise direction.

(iii) Horizontally and an observer looking it from below sees the current to flow in clockwise direction.

Long Answer Type Questions

Q.1. What are magnetic field lines? List three characteristics of these lines. Describe in brief an activity to study the magnetic field lines due to a current flowing in a circular coil.

Q.2. What are magnetic field lines? List any two characteristics of field lines. Draw the pattern of magnetic field lines due to a current carrying circular loop.

Q.3. (i) What is a solenoid?

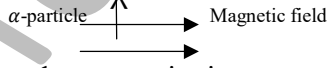
(ii) Draw the pattern of magnetic field formed around a current carrying solenoid compare this field to that of a bar magnet.

(iii) Explain an activity to show that a current carrying conductor experiences a force when placed in a magnetic field.

Q.4. The magnetic field lines associated with current carrying straight conductor is in anticlockwise direction. If the conductor was held horizontally along east-west direction, what is the direction of current through it? Explain it with the help of diagram. Name and state the rule applied to determine the direction of magnetic field. If the conductor is held vertically and current flows from north to south, what will be the direction of magnetic field lines. Draw diagram.

Q.5. (i) Describe an activity to determine the direction of magnetic field produced by a current carrying straight conductor. Also show that the direction of the magnetic field is reversed on reversing the direction of current.

(ii) An α-particle, (which is a positively charged particle) enters, a uniform magnetic field at right angles to it as shown below. Stating the relevant principal explain in which direction will this α-particle move?



Q.6. (i) A coil of insulated copper wire is connected to a galvanometer. What happens if a bar magnet is :

(a) pushed into the coil?

(b) withdrawn from inside the coil?

(c) held stationary inside the coil?

Give reasons for your observation.

(ii) Mention one more method of inducing current in a coil.

Q.7. Describe briefly an activity to:

(i) demonstrate the pattern of magnetic field lines around a straight current carrying conductor and,

(ii) Find the direction of magnetic field produced for a given direction of current in the conductor. Name and state the rule to find the direction of magnetic field around a straight current carrying conductor. Draw a diagram to explain the same activity.

Q.9. (i) A stationary charge is placed in a magnetic field. Will it experience a force? Give reason to justify your answer.
(ii) On what factors does the direction of force experienced by a conductor when placed in a magnetic field depend.
(iii) Under what conditions is the force experienced by a current carrying conductor placed in a uniform magnetic field maximum?
(iv) Name and state the rule which gives the direction of force experienced by a current carrying conductor placed in a magnetic field.

Q.12. A student fixes a sheet of white paper on a drawing board. He places a bar magnet in the centre of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the board gently and observes that the iron filings arrange themselves in a particular pattern.
(i) Why do the iron fillings arrange in a pattern?
(ii) What does the lines along which the iron filings align represent?
(iii) What does the crowding of iron filings at the end of the magnet indicate?
(iv) How does strength of magnetic field is indicates?

Topic – 2 (Electric Generator, Electric Motor and Electric Current)

Very Short Answer Type Questions

Q.1. Name any two sources of direct current.

Q.2. Mention the advantage of A.C over D.C. for long distance transmission.

Q.3. List any one point of difference between A.C. and D.C.

Q.4. Name the device used to prevent damage to the electrical appliances and the domestic circuit due to overloading.

Q.5. Name the type of current:
(i) Used in household supply
(ii) Given by a cell.

Q.6. State the value of potential difference between the live wire and the neutral wire in our country.

Q.7. State a difference between the wires used in the element of an electric heater and in a fuse.

Q.8. Mention the colour convention for live, neutral and earth wires.

Q.9. How is the type of current that we receive in domestic circuit different from the one that runs a clock?

Q.10. In domestic electric circuit, with which wire do we connect a fuse?

Q.11. An alternating current has a frequency of 50 Hz. How many times does it change its direction in one second?

Q.12. State the use of earth wire in domestic electric circuit.

Short Answer Type Questions-I

Q.1. Explain the terms: Overloading and short-circuiting.

Q.2. What is a solenoid? Mention two ways to increase the strength of the field of a solenoid.

Q.3. List in tabular form two major differences between an electric motor and a generator.

Q.4. Mention the provision of two different current ratings in our domestic circuits. Explain with reason, the advantage of such a provision.

Q.5. Explain the function of an earth wire. Why is it necessary to earth metallic appliances?

Q.6. List two precautions to be taken to avoid overloading in the domestic circuit. Also state one difference between overloading and short circuiting.

Short Answer Type Questions-II

Q.1. What is overloading and short circuiting? What is the function of earth wire?

Q.2. What is short circuiting? State one factor / condition that can lead to it. Name a device in the household that acts at a safety measure for it. State the principal of its working.

Q.3. What is short-circuiting of an electric circuit? An electric motor of 1.5 kW power rating is operated in a domestic electric circuit of current rating 5A. What would happen when it is switched ON? Give reason for your answer.

Q.4. (a) Give the significance of the following in a domestic circuit:
(i) electric meter
(ii) earthing
(b) List two precautions that should be taken to avoid overloading.

Q.5. List three factors which can cause overloading of domestic electric circuits.

Q.6. Explain the function of fuse in a domestic electric circuit? An electric oven having power rating 2000 W, 220 V is used in an electric circuit, having a fuse of 5A rating. What is likely to happen when the oven is switched on? Explain.

Q.7. Write one difference between direct current and alternating current. Which one of the two is mostly produced at power stations in our country? Name one device which provides alternating current. State one important advantage of using alternating current.

Q.8. Name two electrical appliances of daily use in which electric motor is used. Name and state the principal on which an electric motor works.

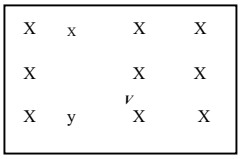
Q.9. Name the three types of wire used in household circuits. Out of these three which wire is used as a safety measure especially for those appliances that have metallic body. State the colour of insulation used for this wire. How it ensures the safety of the user?

Q.10. A circuit has a line of 5A. how many lamps of rating 40W; 220 V can simultaneously run of this line safely?

Q.11. Distinguish between alternating current and direct current. Explain why alternating current is preferred over direct current for transmission over long distances.

Q.12. It is necessary to connect an earth wire to electric appliances having metallic covers. Why? How will you identify earth wire in household circuit?

Q.13. Crosses ⊗ represent a uniform magnetic field directed into the paper. A conductor XY moves in the field toward right side. Find the direction of induced current in the conductor. Name the rule you applied.



What will be the direction of current if the direction of field and the direction of motion of the conductor both are reversed?

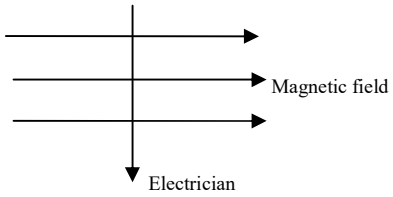
Q.14. An electron enters a magnetic field at right angles to it as shown in fig. The direction of the force acting on the electron will be:

(a) to the right,

(b) to the left,

(c) out of the page,

(d) into the page.



Q.15. A coil of insulated copper wire is connected to a galvanometer. What would happen if a bar magnet is:

(i) Pushed into the coil?

(ii) Withdrawn from inside the coil?

(iii) Held stationary inside the coil?

Q.16. State the function of a 'fuse' in an electric circuit. A circuit has a fuse of 5A. Find the maximum number of 100W, 220V lamps that can be used in this circuit.

Long Answer Type Questions

Q.1. (i) What is meant by the terms alternating current and direct current?

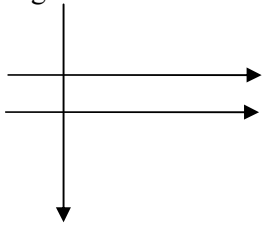
(ii) Name a source of alternating current and direct current?

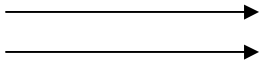
(iii) Mention the frequency of AC supply in India.

(iv) State the two important advantages of alternating current over direct current.

Q.2. (i) Define electromagnetic induction.

(ii) Two coils P and S are wound over the same iron core. Coil P is connected to battery and key and the coil S is connected to galvanometer. Write your observations when:





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(i) Current in the coil P is started by closing the key.

(ii) Current continues to flow in coil P.

(iii) Current in coil P is stopped by removing the key. Explain the reason for such observation.

Q.3. Explain the meanings of the words "electro magnetic" and 'induction' in the term electromagnetic induction. List three factors on which the value of induced correct produced in the circuit depends. Name and state the rule to determine the direction of induced current. State one practical application of this phenomenon in everyday life.

Q.4. (a) Draw a schematic labelled diagram of domestic electric circuit.

(b) Why is it necessary to provide-

(i) a fuse in an electric circuit

(ii) an earth wire to electric application metallic body? Explain.

Q.5. (i) Expalin what is the difference between a direct current and an alternating current. Write one important advantage of using alternating current.

(ii) An air conditioner of 2kW is used in an electric circuit having a fuse of 10A rating. If the potential difference of the supply is 220 V, will the fuse be able to withstand, when the air conditioner is switched on? Justify your answer.

Q.6. Describe any five safety measures that should be taken while dealing with electric appliances connected in domestic electric circuit.

Q.7. (i) Explain two safety measures commonly used in electric circuits and appliances.

(ii) An electron enters a magnetic field at right angles to it as shown in figure. What will be the direction of force acting on the electron? State the rule which gives direction of force on electron.

(iii) If instead of electron, a neutron enters a field, what will be its direction of motion? Give reason for your answer.