

# **EXAMINATION**

## **Magnetic Effects of Electric Current**

Time: 2 Hours

Q1. What does the degree of closeness of magnetic field lines near the poles signify ?

Q2. What are magnetic field lines? How is the direction of magnetic field at a point determined ?

Q3. Give two uses of a magnetic compass.

Q4. How is the strength of the magnetic field around a wire related to the strength of the electric current flowing in the wire ?

Q5. State the rule used to determine the direction of magnetic field produced around a straight conductor carrying current.

Q6. What is an electromagnet? What decides its polarity ? How is an electromagnet made? Mention any two uses of an electromagnet.

Q7. State the rule to determine the direction of current induced in a coil due to its rotation in a magnetic field.

Q8. Name the scientist who discovered that a moving magnet can be used to generate electric current. Further, define electromagnetic induction.

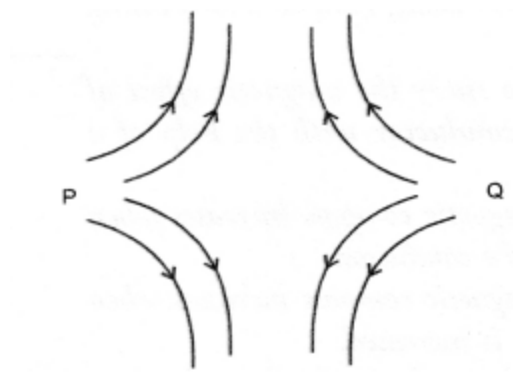
A coil of insulated wire is connected to a galvanometer. What would be seen if a bar magnet with its south pole towards one face of the coil is

(a) moved quickly towards it ?

(b) moved quickly away from it ?

(c) placed near its one face ?

Q9. In the figure below, identify the poles marked P and Q as North Pole or South pole. Give reason for your answer.



Q10. A horizontal power line carries current in east to west direction. What is the direction of the magnetic field due to the current in the power line at a point above and at a point below the power line ?

Q11. A magnetic compass is placed near a current carrying wire. What will you observe

1. When current in the wire is increased,
2. When the magnetic compass is displaced away from the wire ?

Q12. A student performs an experiment to study the magnetic effect of current around a current carrying conductor with the help of a magnetic compass. He reports that :

1. The degree of deflection of the magnetic compass increases when the compass is moved away from the conductor.
2. The degree of deflection of the magnetic compass increases when the current through the conductor is increased.

Which of the above observations of the student appears to be wrong and why ?

Q13. Describe with the help of a labelled diagram an activity to demonstrate the force acting on a current carrying conductor due to magnetic field.

Q14. Describe an activity to show that magnetic field is generated around straight current carrying wire.

Q15.State whether an alpha particle will experience any force in a magnetic field if (alpha particles are positively charged particles)

1. it is placed in the field at rest.
2. it moves in the magnetic field parallel to field lines.
3. it moves in the magnetic field perpendicular to field lines.

Justify your answer in each case.

Q16.How does the strength of the magnetic field at the centre of a circular coil of a wire depends on (a) radius of the coil (b) number of turns of the wire of the coil ?

Q17.The magnetic field produced by a current carrying circular coil having  $n$  turns is equal to  $n$  times the magnetic field produced by a current carrying circular coil having a single turn. Explain, why ?

Q18.Current is flowing clockwise in a circular coil lying in the plane of a table. Using Right Hand Thumb rule, state the direction of the magnetic field inside and outside the coil.

Signs used to show the direction of magnetic field

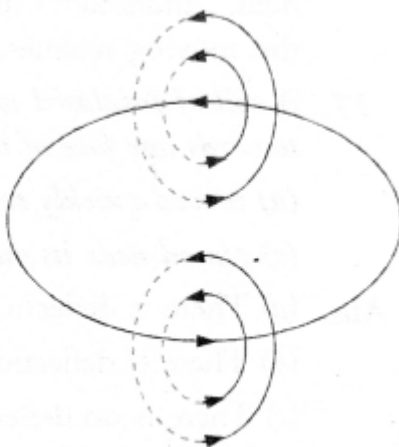
Into the page



Out of the page



In the plane of the pages



**Or**

Consider a circular loop of wire lying in the plane of a table. Let the current pass through the loop clockwise. Apply the right hand rule to find the direction of the magnetic field inside and outside the loop.

Q19. Give three differences between an electromagnet and a permanent magnet. List the three factors and explain how strength of an electromagnet depends on these.

Q20. Explain, the construction and working of an electric motor using a well labelled diagram.