THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

AIM HIGH, TOGETHER WE FLY

GRADE 10 – PHYSICS-
Worksheet
CHAPTER 13 – Manetic Effects of Electricity

MULTIPLE CHOICE QUESTIONS

1) **Two magnetic field lines:**

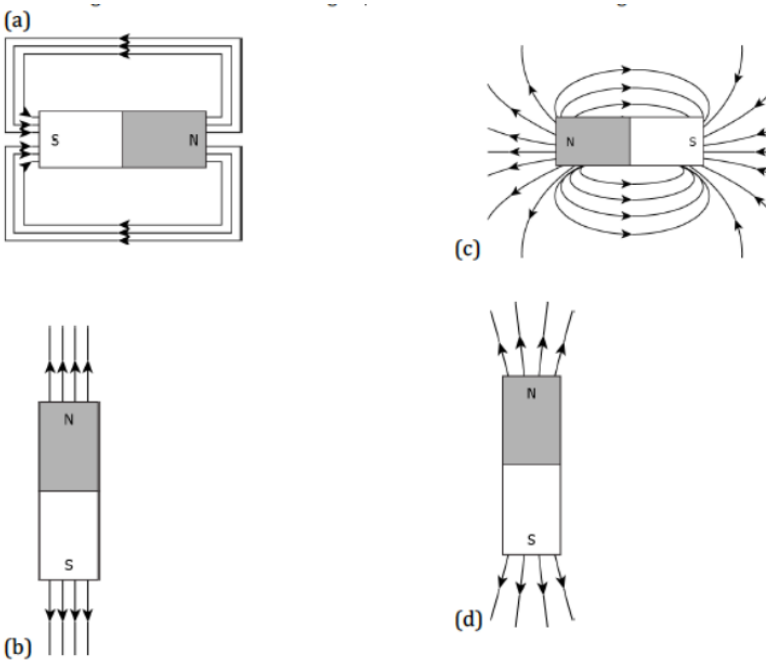
a) Intersect at the neutral point

b) Never intersect each other

c) Intersect near north-pole or south pole

d) Intersect at the midpoint of the magnet

2) A student learns that magnetic field strength around a bar magnet is different at every point. Which diagram shows the correct magnetic field lines around a bar magnet?



3) **Which of the following is the property of a magnetic field?**

A) It can change the direction of a moving charged particle

B) It can change the speed of a moving charged particle

C) It can create an electric field

D) It can create a gravitational field

4) **When a current-carrying coil is placed in a magnetic field, what is the force experienced by the coil?**

A) Electric force

B) Gravitational force

C) Magnetic force

D) None of the above

5) No force acts on a current carrying conductor when it is placed-

a. perpendicular to the magnetic field
b. parallel to the magnetic field
c. far away from the magnetic field
d. inside a magnetic field

6) What happens to the current in short circuit?

a. reduces substantially
b. .does not change
c. increases heavily
d. vary continuously

7) **What is an electromagnet?**

A) A magnet made of iron

B) A magnet made of copper

C) A magnet made of steel

D) A magnet made of a current-carrying coil

8) **Which of the following is the direction of the force experienced by a current-carrying coil placed in a magnetic field?**

A) Along the direction of the current

B) Opposite to the direction of the current

C) Perpendicular to the direction of the current and the magnetic field

D) Parallel to the direction of the current and the magnetic field

9) **The magnetic field inside a long straight solenoid carrying current:**

a) Is zero

b) Decrease as we move towards its end

c) Is the same at all points

d) Increase as we move towards its end

10) Who has stated the Right hand Thumb Rule?

a. Orsted
b. Fleming
c. Einstein
d. Maxwell

Answer the following:

1) State how the magnetic field produced by a straight current carrying conductor at a point depends on

(a) current through the conductor

(b) distance of point from conductor.

2) (a) State three factors on which the strength of magnetic field produced by a current carrying solenoid depends.

(b) Draw circuit diagram of a solenoid to prepare an electromagnet.

3) (a) State Right Hand Thumb rule to find the direction of the magnetic field around a current carrying straight conductor.

(b) How will the magnetic field be affected on:

(i) increasing the current through the conductor

(ii) reversing the direction of flow of current in the conductor?

4) Write one application of right hand thumb rule.

5) What is solenoid? Draw the pattern of magnetic field lines of

(i) a current carrying solenoid and

(ii) a bar magnet.

List two distinguishing features between the two fields.

6) 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 carrying circular oil.

7) Draw the magnetic field lines through and around a single loop of wire carrying electric current.

8) What is a solenoid? Draw a diagram to show field lines of the magnetic field through and around a current carrying solenoid. State the use of magnetic field produced inside a solenoid. List two properties of magnetic lines of force.

9) Write one application of Flemings left hand rule.

10) Describe an activity with labelled diagram to show that a force acts on current carrying conductor placed in a magnetic field and its direction of current through conductor. Name the rule which determines the direction of this force.

ASSERTION and REASON

In the following questions a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

(b) Assertion and reason both are correct statements but reason is

not correct explanation for assertion.

(c) Assertion is correct statement but reason is wrong statement.

(d) Assertion is wrong statement but reason is correct statement.

1) Assertion (A) : On changing the direction of flow of current through a straight conductor, the direction of a magnetic field around the conductor is reversed.

   Reason (R) : The direction of magnetic field around a conductor can be given in accordance with left hand thumb rule.

2) Assertion (A) : The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is inversely proportional to the current flowing through the solenoid.

   Reason (R) : The magnitude of the magnetic field at a point on the axis of a current carrying solenoid is directly proportional to the number of turns per unit length of a solenoid.

3) Assertion (A) : A compass needle is placed near a current carrying wire. The deflection of the compass needle decreases when the magnitude of an electric current in the wire is increased.

   Reason (R) : Strength of a magnetic field at a point near the conductor increases on increasing the current.

4) Assertion (A) : The strength of the magnetic field produced at the

centre of a current carrying circular coil increases on increasing the current flowing through the coil.

Reason (R) : Magnetic field strength is inversely proportional to the current flowing in the coil.

5) Assertion (A) : On freely suspending a current-carrying solenoid, it comes to rest in N-S direction just like a bar magnet.

Reason (R) : One end of current carrying straight solenoid behaves as a North pole and the other end as a South pole.

Case-Based Questons

1) Case 1

Read the following and answer any four questions from 1(i) to 1(v).

An insulated copper wire wound on a cylindrical cardboard tube such that its length is greater than its diameter is called a solenoid. When an electric current is passed through the solenoid, it produces a magnetic field around it. The magnetic field produced by a current-carrying solenoid is similar to the magnetic field produced by a bar magnet. The field lines inside the solenoid are in the form of parallel straight lines. The strong magnetic field produced inside a current-carrying solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the solenoid. The strength of magnetic field produced by a current carrying solenoid is directly proportional to the number of turns and strength of current in the solenoid.

(i) The strength of magnetic field inside a long current-carrying straight solenoid is
   (a) more at the ends than at the centre
   (b) minimum in the middle
   (c) same at all points
   (d) found to increase from one end to the other.

(ii) The north-south polarities of an electromagnet can be found easily by using
   (a) Fleming's right-hand rule
   (b) Fleming's left-hand rule
   (c) Clock face rule
   (d) Left-hand thumb rule.

(iii) For a current in a long straight solenoid N-and S-poles are created at the two ends. Among the following statements, the incorrect statement is

(a) The field lines inside the solenoid are in the form of straight lines which indicates that the magnetic field is the same at all points inside the solenoid.

(b) The strong magnetic field produced inside the solenoid can be used to magnetise a piece of magnetic material like soft iron, when placed inside the coil.

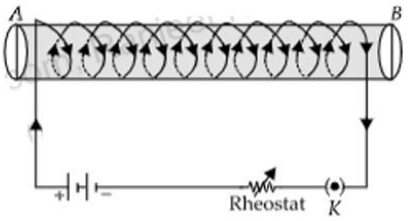
(c) The pattern of the magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.

(d) The N- and S-poles exchange position when the direction of current through the solenoid is reversed.

(iv) A long solenoid carrying a current produces a magnetic field B along its axis. If the current is double and the number of turns per cm is halved, then new value of magnetic field is

(a) B (b) $2B$ (c) $4B$ (d) $B/2$

(v) A soft iron bar is enclosed by a coil of insulated copper wire as shown in figure. When the plug of the key is closed, the face B of the iron bar marked as



(a) N–pole (b) S–pole

(c) N–pole if current is large (d) S–pole if current is small