	INDIAN SCHOOL AL WADI AL KABIR	
Class: X	**DEPARTMENT: SCIENCE 2021-22** **SUBJECT: PHYSICS**	**Date of completion:** **13.02.2022**
Worksheet No: 4 **with answers**	TOPIC: Magnetic effects of electric current	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	CLASS & SEC:	**ROLL NO.**

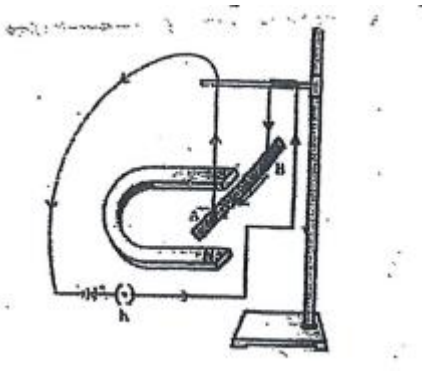
Questions carrying 2 marks

1. Why does a compass needle placed near a current carrying wire show deflection?
2. How is the deflection in the compass needle affected as we move it along a field line (a) towards the poles (b) away from poles?
3. State the factors on which strength of magnetic field due to a straight current carrying conductor depends.
4. "the concentric circles representing the magnetic field around a current carrying straight wire become larger and larger as we move away from it." What conclusion can be drawn from this statement?
5. Name and state the rule to determine the direction of magnetic field produced around a current carrying conductor.
6. Two magnetic lines of force do not intersect each other. Why?

Questions carrying 3 marks

7. Draw the pattern of lines of force due to a magnetic field through and around a current carrying loop of wire. How does the strength of magnetic field produced at the centre of the loop be affected if: -
   (a) strength of the current passing through it is increased? (b) the radius of the loop is reduced?
8. (a) The field lines inside the solenoid are in the form of parallel straight lines. What does this indicate?
   (b) State the rule which is used to find the direction of force exerted on a current carrying conductor when placed in a magnetic field.
   (c) State the rule which is used to find the direction of induced current.
9. A bar magnet is moved towards a solenoid whose ends are connected to a galvanometer? State your observations and give reason for the same.
10. With the help of a neat diagram describe an activity to show the pattern of magnetic field lines around a straight current carrying conductor.

11. Shown below is the experimental set up to conduct the activity to show that the current carrying rod experiences a force when placed in magnetic field.

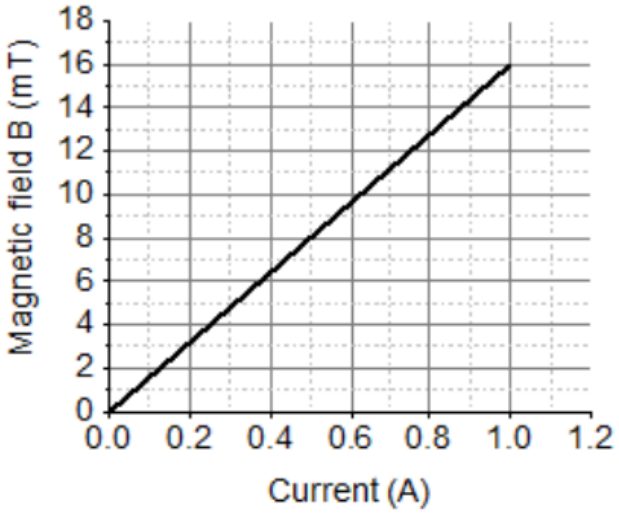


In the figure given above identify two methods to reverse the direction of force

Case-based questions

12 .

A solenoid is a long helical coil of wire through which a current is run in order to create a magnetic field. The magnetic field of the solenoid is the superposition of the fields due to the current through each coil. It is nearly uniform inside the solenoid and close to zero outside and is similar to the field of a bar magnet having a north pole at one end and a south pole at the other depending upon the direction of current flow. The magnetic field produced in the solenoid is dependent on a few factors such as, the current in the coil, number of turns per unit length etc. The following graph is obtained by a researcher while doing an experiment to see the variation of the magnetic field with respect to the current in the solenoid. The unit of magnetic field as given in the graph attached is in milli-Tesla (mT) and the current is given in Ampere.



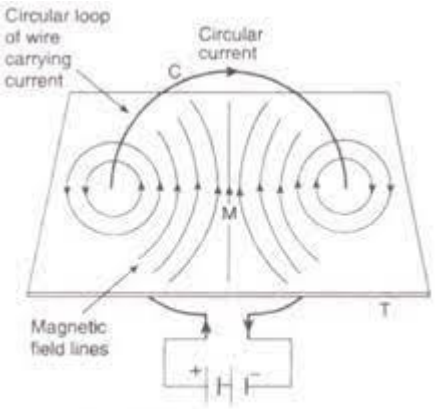
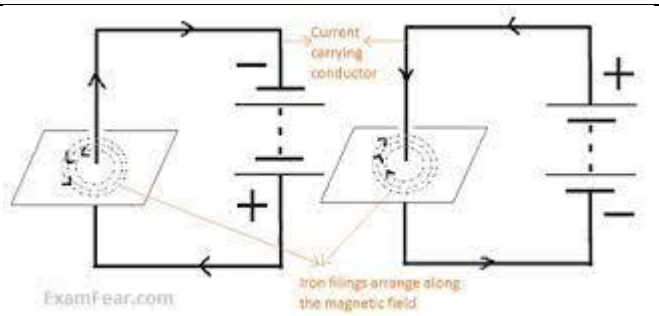
(a) What type of energy conversion is observed in a linear solenoid?

(b) What will happen if a soft iron bar is placed inside the solenoid?

(c) The magnetic field lines produced inside the solenoid are similar to that of …

(d) What happens to the magnetic field when the magnitude of current is increased

Answers

1.	Current carrying wire sets up a magnetic field and the compass gets deflected due to the magnetic field
2.	(a) becomes more (b) becomes less
3.	Depends on the strength of the current and distance from the conductor
4.	Magnetic field decreases with the distance from the current carrying conductor
5.	Right Hand Thumb rule
6.	At one particular point the magnetic compass can show only one direction.
7.	 Magnetic lines of force due to a circular wire carrying current (a) Magnetic field also increases (b) Magnetic field strength increases
8.	(a) Uniform magnetic field (b) Flemings left hand rule (c) Flemings right hand rule
9.	The needle of the galvanometer shows a deflection because a coil kept in the varying magnetic field induces current
10	 A straight current carrying conductor is ser up as shown above. When the current is switched on the pattern of the magnetic field can be traced using a compass. When the direction of the current is reversed the direction of the magnetic field also changes
11	By reversing the direction of current or b reversing the direction of magnetic field
12	a. Electrical to magnetic energy
	b. The magnetic field strength increase
	c. Bar magnet
	d. Magnetic field strength also increases

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