



PHYSICS

BOOKS - OSWAAL PHYSICS (KANNADA ENGLISH)

MAGNETIC EFFECTS OF ELECTRIC CURRENT

Topic 1 Multiple Choice Questions

1. The principle of working of a motor is

A. there is a magnetic field around a current carrying conductor.

B. when a magnetic field linked with a conductor changes, an induced emf is generated in the conductor.

C. the change of current in one coil, induces emf in a neighbouring coil.

D. a conductor carrying electrical current experiences mechanical force if kept in a magnetic field

Answer:



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2. The magnetic is effect of current was discovered by:

A. Faraday

B. Henry

C. Oersted

D. Maxwell

Answer:



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Topic 1 Match The Column

1. Match the following

Column- A	Column- B
1. Concentric field lines are seen	(a) Electromagnet
2. Force experienced by a moving charge	(b) around a straight current carrying wire
3. Moving charge	(c) $qvb \sin \theta$
4. Soft iron	(d) produce magnetic field



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2.

Column- A	Column- B
1. A.C. Dynamo	(i) Stepping up the A.C. voltage to transport electricity to distant places
2. Step-up transformer	(ii) Equipment like washing machine work on A.C. source

3. D.C. motor	(iii) In discharge tube experiments to obtain very high D.C. voltage from a low D.C. voltage.
4. Induction coil	(iv) In thermal power station to produce alternate current
	(v) At the distribution point from domestic supply and at the receiving centre to decrease the voltage.
	(vi) In vehicles to obtain low voltage D.C. from high voltage A.C.
	(vii) In devices like toys, tape-recorders etc.



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Topic 1 Very Short Answer Type Questions

1. What is meant by magnetic field ?



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2. Define magnetic field of bar magnet.



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3. Define the term 'induced current'.



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



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

conductor ?



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



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



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



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9. 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.



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



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11. State the conclusions that can be drawn from the observation that a current carrying

wue deflects a magnetic needle placed near it



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12. 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 .



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



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14. 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?



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



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16. 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 ?



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Topic 1 Short Answer Type Questions I

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



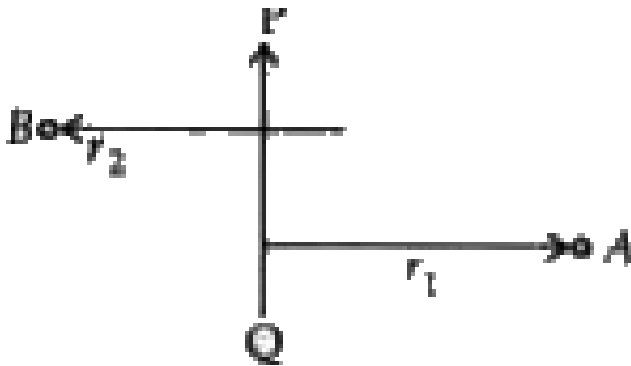
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2. State Right Hand Thumb Rule and also draw diagram.



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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?



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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 density of magnetic field lines differ at these parts ?



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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.



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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

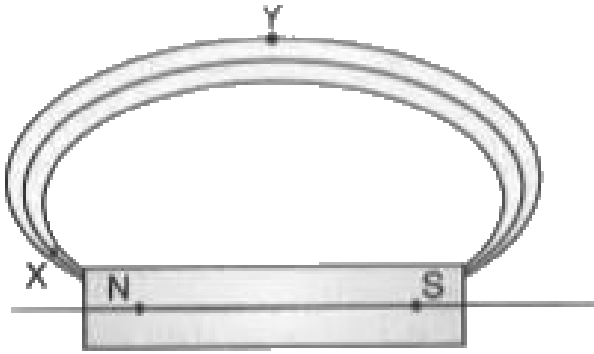
where magnetic field is to be determined, is moved away from the straight wire carrying constant current ? Justify your answer.



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7. Magnetic field lines are shown in the given diagram. A student makes a statement that magnetic field at X is stronger than at Y. Justify this statement. Also redraw the diagram and

mark the direction of magnetic field lines .



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

(i) electrons (ii) Neutrons

Justify your answer.



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9. Two magnets are lying side by side as shown below. Draw magnetic field line between poles P and Q.



P



Q



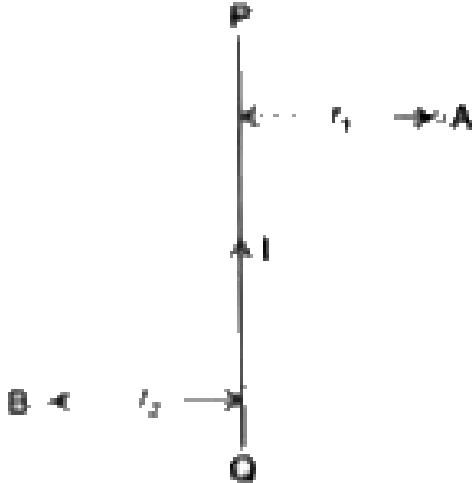
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10. What does the degree of closeness of magnetic field lines near the poles signify ?



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11. 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.

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12. In the experiment to show that a current carrying conductor when placed in the

uniform magnetic field experiences a force.

Whathappens when:

you reverse the terminals of the battery ?



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13. In the experiment to show that a current carrying conductor when placed in the uniform magnetic field experiences a force.

Whathappens when:

the direction of current is perpendicular to

the direction of magnetic field ? State your observation.



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14. 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 :



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15. 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 :



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16. (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.

(c) What is the effect of placing an iron core in the coil AB?



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Topic 1 Short Answer Type Questions li

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



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



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



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4. What is meant by a magnetic field ? Mention two parameters that are necessary to describe it completely.



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5. If field lines of a magnetic field are crossed at a point, what does it indicate ?



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



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7. 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.



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8. 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.



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9. 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.



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10. State and explain Fleming's right hand rule for the direction of induced current.



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



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12. Explain briefly two different ways to induce current in a coll. State the rule which determines the direction of induced current.



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13. Explain the magnetic effects of current with the help of an activity. along with labelled diilgram.



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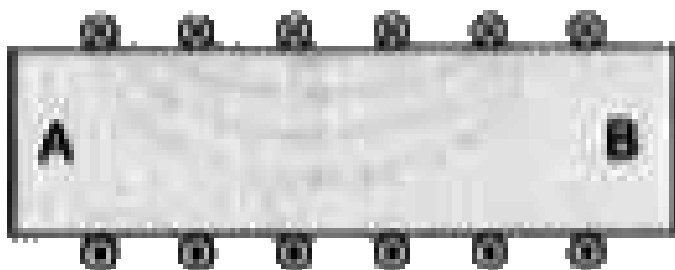
14. You are given a strong bar magnet and a magnet compass needle. Describe an activity by which the magnetic field lines due to the bar magnet can be drawn.



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15. Diagram shows lengthwise 2 sections of a current carrying solenoid. X indicates current entering into the page, and 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.



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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.



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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 anti clockwise direction.

(ii) Vertically in East-West plane and an

observer looking it from south sees the current to flow in anti clockwise direction.

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



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Topic 1 Long Answer Type Questions

1. What are magnetic field lines ? List two characteristics of these lines. Describe in brief

an activity to study the magnetic field lines due to a current flowing in a circular coil.



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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.



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3. What is a solenoid ?



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4. Draw the pattern of magnetic field formed around a current carrying solenoid. Compare this field to that of a bar magnet.



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



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6. The magnetic field lines associated with current carrying straight conductor is in anti clockwise direction. If the conductor was held horizontally along east-west direction, what is the direction of current through it ? Explain it

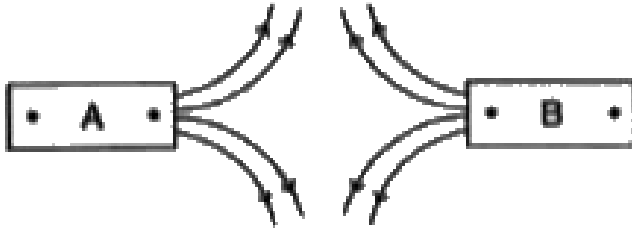
with the help of diagram. Name and state the rule applied to determine the direction of magnetic field. If the conductor is held vertically and current flows from north to south, what will be the direction of magnetic field lines. Draw diagram.



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7. Magnetic field lines of two bar magnets A and B are as shown below. Name the poles of

the magnets facing each other



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8. Two magnetic field lines never intersect each other. Why?



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9. How does the strength of the magnetic field at the centre of a current carrying circular coil depend on the

(i) radius of the coil,

(ii) number of turns in the coil, and

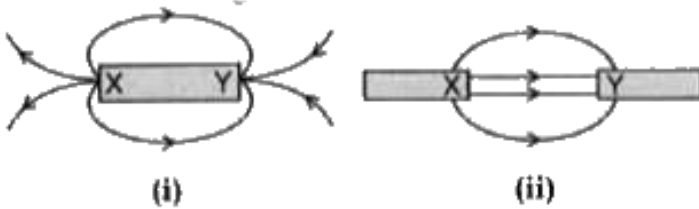
(iii) strength of the current flowing in the coil

?



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10. Identify the nature of poles (X and Y) of the magnets in a given figure .



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11. Draw field lines around a current carrying loop. What happens to the magnetic field lines due to a current carrying straight conductor when the current is reversed ? State the rule

which gives relation between magnetic field lines and direction of current



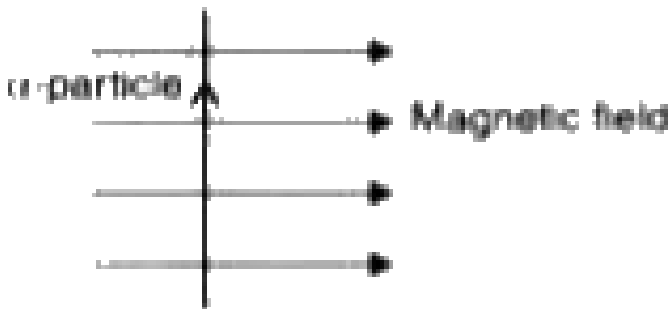
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12. Describe an activity to determine the direction of magnetic field produced by a current carrying straight conductor. Also show that the direction of the magnetic field is reversed on reversing the direction of current.



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13. 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 principle explain in which direction will this α -particle move ?



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14. 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.

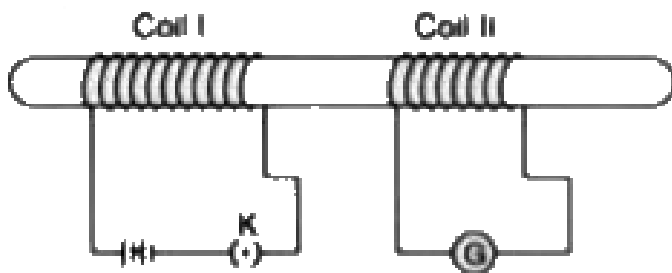


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15. Mention one more method of inducing current in a coil.

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16. Two coils of insulated copper wire are wound over a non conducting cylinder as shown. Coil I has larger number of turns.



(i) Write your observations when,

(a) key K is dosed,

(b) key K is opened,

(ii) Give reason for your observations.

(iii) Mention the name of the phenomenon involved and define it.

(iv) Name of two coils used In this experiment

(v) State the rule which gives the direction of induced current



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17. 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.



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18. A stationary charge is placed in a magnetic field. Will it experience a force ? Give reason to justify your answer.



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19. On what factors does the direction of force experienced by a conductor when placed in a magnetic field depend ?



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20. Under what conditions is the force experienced by a current carrying conductor placed in a uniform magnetic field is maximum ?



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21. Name and state the rule which gives the direction of force experienced by a current carrying conductor placed in a magnetic field.



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22. 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 filings arrange in a pattern
- (ii) What do 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 ?



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Topic 2 Multiple Choice Questions

1. A domestic electrical appliance requires alternating current of 15 V. If 220 V of alternating current is supplied to the house, then the device that helps in the functioning of that electrical appliance is :

A. induction coil

B. step-up transformer

C. AC dynamo

D. step-down transformer

Answer:



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2. In Fleming's right hand rule, middle finger indicates the direction of:

A. magnetic field

B. induced electric current

C. mechanical energy

D. motion of the conductor

Answer:



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3. A dynamo having split rings is its armature is inducing certain current in the internal

circuit. The device that can be used to increase this current is:

- A. rectifier
- B. transformer
- C. induction coil
- D. oscillator

Answer:



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1. Name any two sources of direct current.



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



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



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



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5. Name the type of current:

(i) Used in household supply

(ii) Given by a cell.



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



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



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



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



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



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11. State the use of earth wire in domestic electric circuit.



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Topic 2 Short Answer Type Questions I

1. Draw the diagram of an electric motor and label the following parts.

(i) Split rings (b) Brushes

Two ways to increase the strength of the field of a solenoid:

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2. Explain the terms : Overloading and short-circuiting.

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



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



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



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



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



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Topic 2 Short Answer Type Questions Ii

1. State Faraday's laws of electromagnetic induction.



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2. What is overloading and short circuiting ?

What is the function of earth wire ?



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



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4. 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.



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5. 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.



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



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7. 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.



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8. 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.



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9. Name two electrical appliances of dally use in which electric motor is used. Name and state the principle on which an electric motor works.



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10. Name the three types of wirea used in household drcuits. Out of these three which wire ls 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 ?



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11. A circuit has a line of 50A. How many lamps of rating 40W, 220 V can simultaneously run on this line safely ?



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



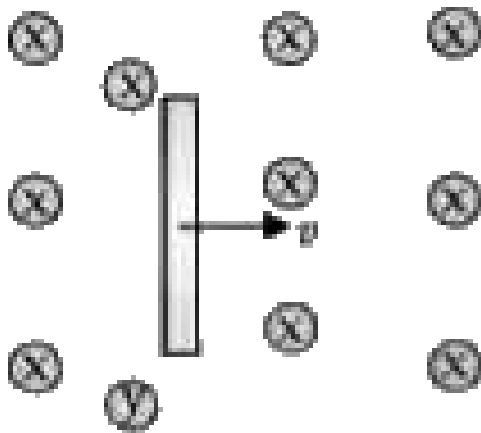
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13. It is necessary to connect an earth wire to electric appliances having metallic covers. Why? How will you identify earth wire in household circuit ?



14. Crosses \otimes 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 ?



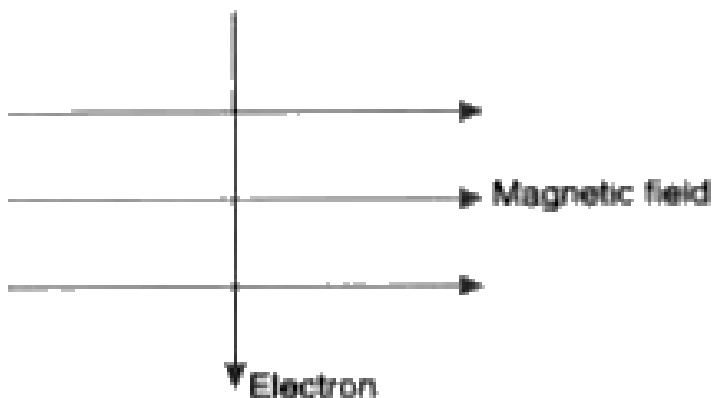
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15. An electron enters a magnetic field at right angles

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.



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16. State the function of a fuse' in an electric circuit. A circuit has a fuse of 5A. Find the

maximum number of 100 W, 220 V lamps that can be used in this circuit.



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Topic 2 Long Answer Type Questions

1. Define electromagnetic induction.



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2. 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:

(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.



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3. What is meant by the terms alternating current



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4. Name a source of alternating current and a source of direct current.



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5. Mention the frequency of AC supply in India.



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6. State two important advantages of alternating current over direct current.



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7. Explain the meanings of the words "electromagnetic" and induction in the term electromagnetic induction. List three factors on which the value of induced current

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.



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8. Draw a schematic labelled diagram of domestic electric circuit.



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9. Why is it necessary to provide-

(i) a fuse in an electric circuit

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



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10. Explain what is the difference between a direct current and an alternating current.

Write one important advantage of using alternating current.



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11. 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.



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12. Describe any four safety measures that should be taken while dealing with electric appliances connected in domestic electric circuit.



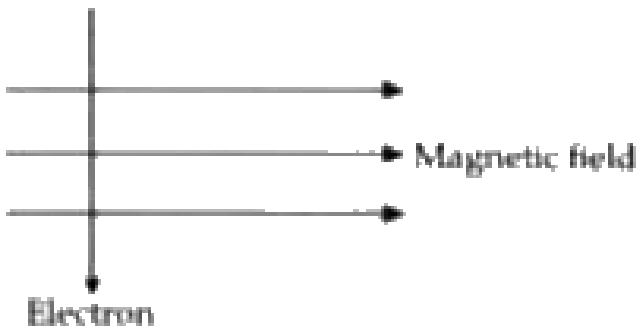
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13. Explain two safety measures commonly used in electric circuits and appliances.



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14. 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.



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



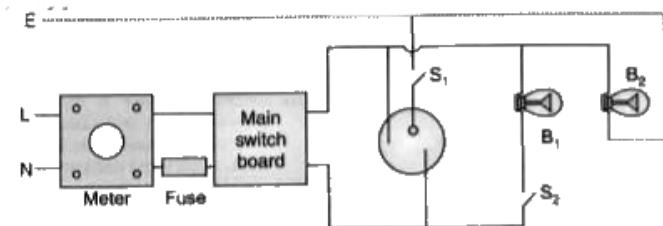
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16. (i) The given figure shows a domestic electric circuit. Study this circuit carefully. List any two errors in the circuit and justify your answer.

(ii) Give one difference between the wires used

in the element of an electric heater and in a fuse.

(iii) List two advantages of parallel connection over series connection.



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Ncert Corner Intext Questions

1. Why does a compass needle get deflected when brought near a bar magnet ?



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2. Why don't two magnetic lines of force intersect each other ?



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



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



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5. Choose the correct option.

The magnetic field inside a long straight solenoid- carrying current

A. is zero .

B. decreases as we move towards its end.

C. increases as we move towards its end.

D. is the same at all points.

Answer:



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6. Which of the following property of a proton can change while it moves freely in a magnetic field ? (There may be more than one correct answer.)

A. mass

B. speed

C. velocity

D. momentum

Answer:



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7. In Activity 13.7, how do we think the displacement of rod AB will be affected if (i) current in rod AB is increased: (ii) a stronger horse-shoe magnet is used, and (ii) length of the rod AB is increased ?



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8. A positively-charged particle (alpha-particle) projected towards west is deflected towards north by a magnetic field. The direction of magnetic field is

- (a) towards south (b) towards east
(c) downward (d) upward

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9. State Fleming's left-hand rule.

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10. What is the principle of an electric motor?



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11. What is the role of the split ring in an electric motor ?



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12. Explain different ways to induce current in a coil.



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13. State the principle of an electric generator.



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14. Name some source of direct current. Solar cell, dry cell, battery



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15. Which sources produce alternating current ?



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16. Choose the correct option.

A rectangular coil of copper wires is rotated in a magnetic field. The direction of the induced current changes once in each.

A. two revolutions

B. one revolution

C. half revolution

D. one fourth revolution

Answer:



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17. Name the safety measures commonly used in electric circuits and appliances.



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18. An electric oven of 2 KW power rating is operated in a domestic electric circuit (220 v) that has a current rating of 5 A. What result do you expect ? Explain.



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19. What precaution should be taken to avoid the overloading of domestic electric circuits ?



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Textbook Exercise

1. Which of the following correctly describes the magnetic field near a long straight wire?

A. The field consists of straight lines perpendicular to the wire.

B. The field consists of straight lines parallel to the wire.

C. The field consists of radial lines originating from the wire.

D. The field consists of concentric circles centred on the wire.

Answer:



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2. The phenomenon of electromagnetic induction is

- A. the process of charging a body.
- B. the process of generating magnetic field due to a current passing through a coil.
- C. producing induced current in a coil due to relative motion between a magnet and the coil.
- D. the process of rotating a coil of an electric motor.

Answer:



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3. The device used for producing electric current is called a

A. generator

B. galvanometer

C. ammeter

D. motor

Answer:



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4. The essential difference between AC generator and a DC generator is that

A. AC generator has an electromagnet while a DC generator has permanent magnet

B. DC generator will generate a higher voltage

C. AC generator will generate a higher voltage

D. AC generator has slip rings while the DC generator has a commutator.

Answer:



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5. At the time of short-circuit, the current in the circuit

A. reduces substantially

B. does not change

C. increases heavily

D. varies continuously

Answer:



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6. State whether the following statements are true or false.

An electric motor converts mechanical energy into electrical energy.



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7. State whether the following statements are true or false.

A wire with a green insulation is usually the live wire.



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8. List two methods of producing magnetic fields.



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9. How does a solenoid behave like a magnet?

Can you determine the north and south poles of a current solenoid with the help of a bar magnet ? Explain.



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10. When is the torque experienced by a current-carrying conductor placed in a magnetic field largest?



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11. Imagine that you are sitting in a chamber with your back to one wall. An electron beam, moving horizontally from back wall towards the front wall, is deflected by a strong magnetic field to your right side. What is the direction of magnetic field?



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12. Draw a labelled diagram of an electric motor. Explain its principle and working. What is the function of a split ring in an electric motor ?



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13. Name some devices in which electric motors are used.



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14. Two circular coils A and B are placed closed to each other. If the current in the coil A is changed, will some current be induced in the coil B? Give reason.



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15. State the rule to determine the direction of a (i) magnetic field produced around a straight conductor- carrying current, (ii) force experienced by a current-carrying straight conductor placed in a magnetic field which is

perpendicular to it and (iii) current induced in a coil due to its rotation in a magnetic field.



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16. Explain the underlying principle and working of an electric generator by drawing a labelled diagram. What is the function of brushes ?



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17. When does an electric short circuit occur?



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18. What is the function of an earth wire? Why is it necessary to earth metallic appliances ?



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