



## PHYSICS

### BOOKS - ZEN PHYSICS (KANNADA ENGLISH)

### MAGNETIC EFFECTS OF ELECTRIC CURRENT

#### In Text Questions

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

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2. Draw the magnetic field lines around a bar magnet.

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3. List the properties of magnetic field lines.



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4. Why don't two magnetic field lines intersect each other ?



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



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7. 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 the points.

**Answer: D**



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8. Which property of a proton can change while it moves freely in a magnetic field ?

- A. mass
- B. speed

C. velocity

D. momentum

**Answer: A::C::D**



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**9.** In activity 13.7 , how do you think the displacement of the rod AB is affected if [i] current in rod AB is increased , [ii] a stronger horseshoe magnet is used , and [iii] length of the rod AB is increased ?



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**10.** A positively-charged particle [alpha particle] projected towards the west is deflected towards the north by a magnetic field. The direction of the magnetic field is .

A. towards south

B. towards east

C. downwards

D. upward

**Answer:**



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**11. State Fleming's left hand rule or motor rule.**



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**12. What is the principle of an electric motor ?**



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



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



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15. State the principle of an electric generator.



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16. Name some sources of direct current .



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17. Which sources produce alternating current ?



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**18.** Choose the correct option.

A rectangular coil of copper wire 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: C**



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**19.** Name two safety measures commonly used in electric circuits and appliances.



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20. An electric oven of 2 kW power rating is operated in a domestic electric circuit [220V] that has a current rating of 5 A. What result do you expect ? Explain.



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



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

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- 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 around the wire.

**Answer: D**



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2. The phenomenon of electromagnetic induction is

- A. the process of charging a body
- B. the process of generating a magnetic field due to a current passing through a coil



- C. Producing an 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: C**



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

- A. generator
- B. galvanometer
- C. ammeter
- D. motor

**Answer: A**



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4. The essential difference between an AC generator and a DC generator ?

- A. AC generator has an electromagnet while a DC generator has permanent magnet
- B. DC generator generates a higher voltage.
- C. AC generator generates a higher voltage
- D. AC generator has slip rings while the DC generator has a commutator

**Answer: D**



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

- A. reduces substantially
- B. does not change

C. increases heavily

D. varies continuously

**Answer: C**



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

A. An electric motor converts mechanical energy into electric energy.

B. An electric generator works on the principle of electromagnetic induction.

C. The field lines at the centre of a long circular coil carrying current are parallel straight lines.

D. A wire with a green insulation is usually the live wire of an electric supply.

**Answer:**



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7. List two methods of producing magnetic fields.



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8. How does a solenoid behave like a magnet ? Can you determine the north and south poles of a current-carrying solenoid with the help of a bar magnet ? Explain.



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9. When is the force experienced by current carrying conductor placed in a magnetic field largest ?



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



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**11.** 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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**12.** Name some devices in which electric motors are used.



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**13.** A coil of insulated copper wire is connected to a galvanometer. What happens if a bar magnet is [i] pushed into the coil [ii] withdrawn from inside the coil [iii] held stationary inside the coil ?



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**14.** Two circular coils A and B are placed close to each other. If the current in the coil A is changed, is some current 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 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 and working of an electric generator by drawing a labelled diagram. What is the function of brushes ?



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**17.** Draw the diagram of a simple electric generator. Label the following parts :

[i] Brushes [ii] Rings.



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**Answer: D**



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**21.** The phenomenon of electromagnetic induction is



- A. the process of charging a body
- B. the process of generating a magnetic field due to a current passing through a coil
- C. Producing an 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: C**



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- C. The field lines at the centre of a long circular coil carrying current are parallel straight lines.

D. A wire with a green insulation is usually the live wire of an electric supply.

**Answer:**



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### Additional Question Section Multiple Choice Question

1. Commercial electric motors do not use

- A. An electromagnet to rotate the armature
- B. Effectively the large number of turns of conducting wire in the current-carrying coil
- C. A permanent magnet to rotate the armature



D. A soft iron core on which the coil is wound

**Answer: C**



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**2. Choose the incorrect statement.**

- A. Fleming's right-hand rule is a simple rule to know the direction of induced current.
- B. The right-hand thumb rule is used to find the direction of magnetic fields due to current -carrying conductors.
- C. The difference between the direct and alternating currents is that the direct current always flows in one direction by the alternating current its direction periodically.
- D. In India, the AC changes direction after every  $1/50$  second.

**Answer: D**



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3. The strength of the magnetic field around an infinite current carrying conductor 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.

**Answer: C**



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4. The right-hand thumb rule was stated by

- A. Oersted
- B. Fleming

C. Maxwell

D. Ampere

**Answer: C**



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**5. Who was the first to observe the magnetic effect of electric current ?**

A. Faraday

B. Oersted

C. Volta

D. Ampere

**Answer: B**



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6. Who gave the principle of electromagnetic induction ?

A. Faraday

B. Oersted

C. Maxwell

D. Ampere

**Answer: A**



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7. Which instrument detects the presence of electric current in a circuit ?

A. galvanometer

B. voltmeter

C. generator

D. magnetic compass needle

**Answer: A**



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**8. Electromagnetic induction occurs when**

- A. there is a relative motion between the coil of a wire and a galvanometer
- B. there is relative motion between a galvanometer and a magnet
- C. there is a relative motion between a galvanometer and a generator
- D. there is a relative motion between the coil of a wire and a magnet

**Answer: D**



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**9. The phenomenon of electromagnetic induction is**

- A. The process of inducing charges in a body
- B. The process of rotating a coil of an electric motor
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- D. The process of generating magnetic field due to a current passing through a coil

**Answer: C**



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**10.** 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

**Answer: B**



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**11.** The device used for producing electric current is called

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C. ammeter

D. motor

**Answer: A**



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**12.** Which of the following statements is false ?

- A. The direction of magnetic field lines is from north pole to south pole
- B. If magnetic field lines are closer, there is strong magnetic field
- C. The magnetic field lines form closed loops.
- D. The magnetic field lines can cross one another.

**Answer: D**



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**13.** According to the right-hand thumb rule, thumb indicates the direction of

- A. Electric current
- B. Magnetic field
- C. Magnetic force
- D. Motion of conductor



**Answer: A**



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**14.** The direction of a magnetic field can be determined using

- A. Faraday's law
- B. Fleming's right-hand rule
- C. Right-hand thumb rule
- D. Fleming's left-hand rule

**Answer: C**



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**15.** The magnetic field at the centre of the current carrying coil :

- A. circular

- B. a straight line
- C. an ellipse
- D. zero at the centre

**Answer: B**



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**16.** Which of the following has a magnetic field like that of a bar magnet ?

- A. Current-carrying wire
- B. Current-carrying ring
- C. Current-carrying solenoid
- D. Current-carrying rectangular loop.

**Answer: C**



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17. In which of the following cases is no current induced in the loop ?

- A. The loop is moved in the direction of the magnet
- B. The magnet is moved in the direction of the loop
- C. The loop and the magnet are moved in the same direction with same speed
- D. The loop and the magnet are moved in opposite direction with same speed.

**Answer: C**



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18. Which of the four rings has the strongest magnetic field at its centre if same current flows through them ?



A.



B.



C.



D.

**Answer: A**



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**19.** The strength of the magnetic field produced in a current-carrying straight conductor is

- A. directly proportional to the distance from the wire
- B. directly proportional to the magnitude of the current in wire
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**Answer: B**



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**20.** Choose the correct option.

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- B. Strong at S-pole and weak at N-pole

C. uniform throughout

D. zero

**Answer: C**



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21. The current passing through two separate circuits of our houses is \_\_\_\_\_ A and \_\_\_\_\_ A.

A. 5,10

B. 5,15

C. 10,15

D. 2,5

**Answer: B**



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**22.** A magnetic field does not exert a force on

- A. a bar magnet
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- C. an electromagnet
- D. an electric charge moving perpendicular to it

**Answer: B**



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**23.** Which coloured insulation cover is used for earthing wire ?

- A. Red
- B. Black
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**Answer: C**



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**24.** Connecting too many appliances in a circuit causes

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**Watch Video Solution**

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**Answer: C**



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- D. independent of the magnitude of the current in wire

**Answer: B**

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**45.** The magnetic field inside the solenoid is

- A. strong at N-pole and weak at S-pole
- B. Strong at S-pole and weak at N-pole
- C. uniform throughout
- D. zero

**Answer: C**

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46. The current passing through two separate circuits of our houses is \_\_\_\_\_ A and \_\_\_\_\_ A.

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C. 10,15

D. 2,5

**Answer: B**



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**Answer: B**



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**Answer: C**



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**Answer: C**



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**50.** At the time of short circuit, the current in the circuit,

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C. remains constant

D. varies continuously

**Answer: B**



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## Additional Question Section Match The Following

1.

Column- A

A] Commutator

B] Fuse

C] Galvanometer

D] Electric generator

Column - B

i] detects the presence of electric current in a circuit

ii] converts mechanical energy into electrical energy

iii] measures the potential difference

iv] shows the direction of the motion of the conducto

v] protects the electrical appliances

vi] reverses the direction of current

viii] converts electrical energy into mechanical energy



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2.

Column- A

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vi] reverses the direction of current

viii] converts electrical energy into mechanical energy



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## Additional Question Section Very Short Answer Vsa Type Questions

1. What is meant by magnetic field ?



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



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3. Name an instrument, in which the directive property of a magnet is used.



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4. Identify the poles of the magnet in the figure.



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5. What is the basic cause of an induced emf ?



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6. Does an induced emf develop in a conductor when moved in a direction parallel to the magnetic field ?



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7. State the conclusion from the observation that a current-carrying wire deflects a magnetic needle placed near it .



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8. What is magnetic effect of current ?



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9. Why are magnetic field lines closed curves ?



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10. What happens if a bar magnet is cut into two pieces

i] perpendicular to its length ii] along its length ?



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11. What does the divergence of magnetic field lines near the end of a current-carrying straight solenoid indicate ?



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**12.** How can a solenoid be used to magnetise a steel bar ?



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**13.** In a solenoid, the current through each circular loop flows in the same direction. What is its effect ?



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**14.** Name the rule which gives the direction of induced current in a conductor .



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**15.** How is induced current in a secondary coil related to current in a primary coil ?



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16. Whenever there is a relative motion between a magnet and a coil, a current is induced in the coil. Name this phenomenon.



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17. Why is an alternating current advantageous over a direct current for long-range transmission of electric energy ?



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18. How can we trace a current-carrying wire hidden in a wall?



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19. What is an electric generator or dynamo ?



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**20.** Name the type of current given by a cell.



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**21.** How is the type of current received in a domestic circuit different from one that runs a clock ?



**Watch Video Solution**

**22.** How can it be shown that a magnetic field exists around a wire through which a direct current is passing?



**Watch Video Solution**

**23.** In a domestic electric circuit, mention the potential difference between a live wire and a neutral wire and frequency of an AC.



**Watch Video Solution**



**24.** What is the advantage of the earth-wire connection in domestic electrical circuits ?



**Watch Video Solution**

**25.** On which effect of an electric current does a fuse work ?



**Watch Video Solution**

**26.** What are the functions of live and neutral wires ?



**Watch Video Solution**

**27.** What is the difference between the wires used in the element of an electric heater and in a fuse ?



**Watch Video Solution**

**28.** Electricians wear rubber shoes or rubber hand gloves while working .  
Why ?



**Watch Video Solution**

**29.** What are the two possible causes of excessive heating of electric wires  
?



**Watch Video Solution**

**30.** What happens if a 5 A fuse is connected to a wire carrying 15 A current  
?



**Watch Video Solution**

**31.** What is the colour of live wire ?



**Watch Video Solution**

**32.** A current flows through a horizontal power line from east to west.  
What is the direction of magnetic field at a point directly below it ?



**Watch Video Solution**

**33.** What is meant by magnetic field ?



**Watch Video Solution**

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



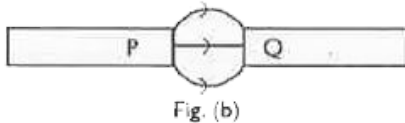
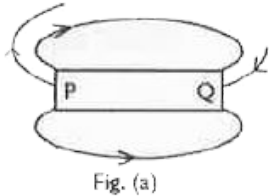
**Watch Video Solution**

**35.** Name an instrument, in which the directive property of a magnet is used.



**Watch Video Solution**

36. Identify the poles of the magnet in the given Figures.

[Watch Video Solution](#)

37. What is the basic cause of an induced emf ?

[Watch Video Solution](#)

38. Does an induced emf develop in a conductor when moved in a direction parallel to the magnetic field ?

[Watch Video Solution](#)

**39.** State the conclusion from the observation that a current-carrying wire deflects a magnetic needle placed near it .



**Watch Video Solution**

**40.** What is magnetic effect of current ?



**Watch Video Solution**

**41.** Why are magnetic field lines closed curves ?



**Watch Video Solution**

**42.** What happens if a bar magnet is cut into twopieces  
i] perpendicular to its length ii] along its length ?



**Watch Video Solution**

**43.** What does the divergence of magnetic field lines near the end of a current-carrying straight solenoid indicate ?



**Watch Video Solution**

**44.** How can a solenoid be used to magnetise a steel bar ?



**Watch Video Solution**

**45.** In a solenoid, the current through each circular loop flows in the same direction. What is its effect ?



**Watch Video Solution**

**46.** Name the rule which gives the direction of induced current in a conductor .



**Watch Video Solution**

**47.** How is induced current in a secondary coil related to current in a primary coil ?



**Watch Video Solution**

**48.** Whenever there is a relative motion between a magnet and a coil, a current is induced in the coil. Name this phenomenon.



**Watch Video Solution**

**49.** Why is an alternating current advantageous over a direct current for long-range transmission of electric energy ?



**Watch Video Solution**

**50.** How can we trace a current-carrying wire hidden in a wall ?



**Watch Video Solution**



[Watch Video Solution](#)

51. What is an electric generator or dynamo ?



[Watch Video Solution](#)

52. Name the type of current given by a cell.



[Watch Video Solution](#)

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**Watch Video Solution**

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**Watch Video Solution**

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**Watch Video Solution**

**64.** A current flows through a horizontal power line from east to west. What is the direction of magnetic field at a point directly below it ?



**Watch Video Solution**

### Additional Question Section Short Answer Sa Type 1 Questions

**1.** Give two uses of a magnetic compass.



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2. A freely suspended magnet always points along north-south direction.

Why ?



[Watch Video Solution](#)

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



[Watch Video Solution](#)

4. What is the direction of magnetic field lines inside a bar magnet and outside of it .



[Watch Video Solution](#)

5. What does the degree of closeness of the field lines represent ?



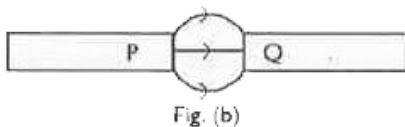
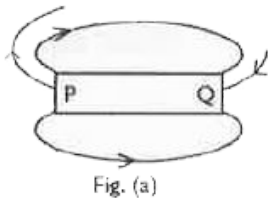
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6. Name the SI unit of magnetic field and define it.



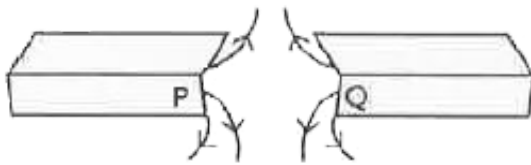
**Watch Video Solution**

7. Identify the poles of the magnet in the given Figures.



**Watch Video Solution**

8. In the Figure, identify the poles marked P and Q as north pole or south pole. Give reason.



**Watch Video Solution**

9. Why does a current-carrying conductor experience a force in a magnetic field?



**Watch Video Solution**

10. It is established that an electric current through a conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving

i] Alpha particles ?

ii] Neutrons ? Justify your answer .



**Watch Video Solution**

**11.** A magnetic compass shows a deflection when placed near a current-carrying wire. How does the deflection of the compass get affected, if the current in the wire is increased ? Support your answer with a reason.



**Watch Video Solution**

**12.** A horizontal power line carries a current from 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 ?



**Watch Video Solution**

**13.** What would happen to the direction of rotation of a motor, if

- i] the current was reversed ?
- ii] both current and magnetic field were reversed simultaneously ?



**Watch Video Solution**

14. How can the speed of rotation of the armature coil of an electric motor be increased ?



**Watch Video Solution**

15. Draw the diagram of a simple electric motor. Label the following parts :

i] Split rings ii] Brushes.

i] Burshes ii] Battery



**Watch Video Solution**

16. In what way can the magnitude of an induced current be increased ?



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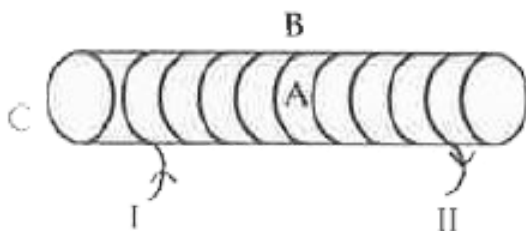
17. State the factors on which the induced emf in a coil rotating in a uniform magnetic field depends.

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18. If the speed of rotation of the armature of a generator is doubled, how does it affect [i] the maximum emf produced and [ii] the frequency of the emf ?

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19. For the current-carrying solenoid shown, draw the magnetic field lines, and giving reason, explain where, out of three points A, B and C, the field strength is maximum and where it is minimum .





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**20.** What kind of energy transformation takes place in an electric motor ?

Name any two devices which use electric motor as an essential component of their working .



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**21.** What is the role of fuse used in series with any electrical appliance ?

Why should a fuse with a defined rating not be replaced by one with a large rating?



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**22.** Why is the earth pin longer and thicker than live and neutral pins ?



[Watch Video Solution](#)

**23.** Name the three types of wires used in domestic circuits and mention the colour of their insulation.



**Watch Video Solution**

**24.** Give two uses of a magnetic compass.



**Watch Video Solution**

**25.** A freely suspended magnet always points along north-south direction.  
Why ?



**Watch Video Solution**

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



**Watch Video Solution**

27. What is the direction of magnetic field lines inside a bar magnet and outside of it .

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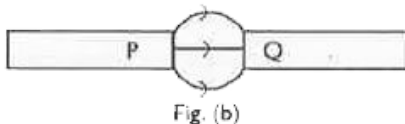
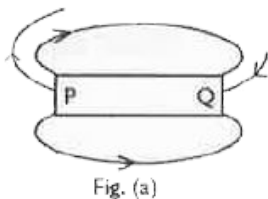
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 [Watch Video Solution](#)

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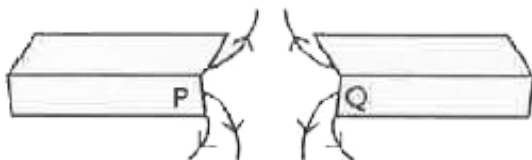
 [Watch Video Solution](#)

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 [Watch Video Solution](#)

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 [Watch Video Solution](#)

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**Watch Video Solution**

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**Watch Video Solution**

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**Watch Video Solution**

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**Watch Video Solution**

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**Watch Video Solution**

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**Watch Video Solution**

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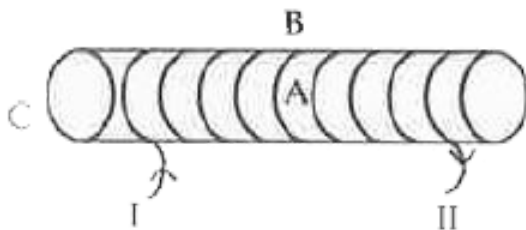


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45. Why is the earth pin longer and thicker than live and neutral pins ?



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46. Name the three types of wires used in domestic circuits and mention the colour of their insulation.



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### Additional Question Section Short Answer Sa Type 2 Questions

1. Mention some uses of electromagnets .



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2. Name and state the rule to determine the direction of a force experienced by a straight current-carrying conductor placed in a

magnetic field which is perpendicular to it.



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3. State Fleming's left-hand rule.



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4. A student studying the force experienced by a current-carrying conductor in a magnetic field records the following observations : [i] The force experienced by the conductor increases as current is increased. [ii] The force experienced by the conductor decreases as the strength of the magnetic field is increased. Which of the two observations is correct and why?



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5. List four factors on which the magnitude of the force acting on a current-carrying conductor in a magnetic field depends.



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6. When is the force experienced by current carrying conductor placed in a magnetic field largest ?



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7. A proton beam is moving along the direction of a magnetic field. What force acts on the proton beam ?



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8. What happens to the force acting on a current-carrying conductor placed in a magnetic field when : a] current in conductor increases ? b]

length of the conductor increases ? c] direction of the current and magnetic field are reversed ? d] direction of the current is reversed without changing the direction of magnetic field ?



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9. State if an alpha particle [alpha particles are positively charged] experiences any force in a magnetic field if [i] it is placed in the field and is at rest. [ii] it moves in the magnetic field parallel to field lines. [iii] it moves in the magnetic field perpendicular to field lines . Justify your answer in each case.



**Watch Video Solution**

10. Explain the meaning of the term electromagnetic induction. On what factors do the induced current produced in a circuit depend ? Name and state the rule used to find the direction of induced current . State one practical application of this phenomenon in everyday life.



11. A coil made of insulated copper wire is connected to a galvanometer .

- i] What happens to the deflection of the galvanometer if this coil is moved towards a stationary bar magnet and then
- ii] Moved away from it ? Give reason for you answer and name the phenomenon involved.

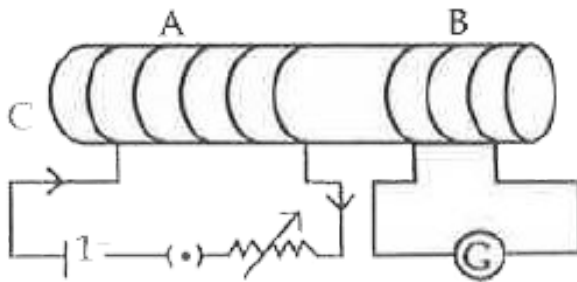


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12. In the arrangement shown below, two different coils A and B are inserted over a non-conducting hollow cylinder :

- i] Does the galvanometer [G] show any deflection when a constant current flows in coil A ?
- ii] Does the galvanometer show any deflection when current in coil A is changed with the help of the rheostat ?
- iii] Is there any change in deflection if the current in the coil A is changed at a faster rate ?

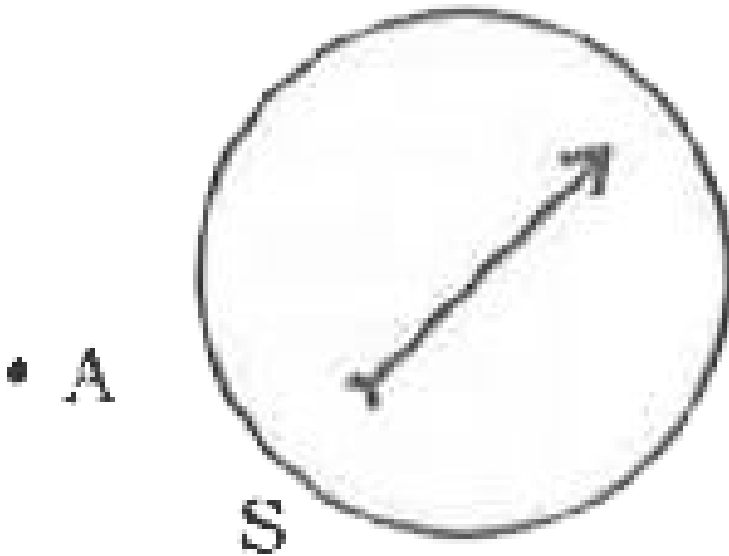
Explain your observation in each case.



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**13.** A magnetic compass needle is placed on the plane of paper near A as shown in figure. In which plane should a straight current-carrying conductor be placed, so that it passes through A and there is no change in the deflection of the compass ? Under what condition is the deflection

maximum and why ?



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14. Name and state the two rules for finding the direction of magnetic field produced by an electric current through a straight conductor.



[Watch Video Solution](#)

15. The direction of a magnetic field can be determined using





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**16.** State Fleming's left-hand rule.



[Watch Video Solution](#)

**17.** Name the rule which gives the direction of induced current in a conductor .



[Watch Video Solution](#)

**18.** On what factors do the magnetic field produced by a straight current-carrying conductor depend ?



[Watch Video Solution](#)

**19.** What happens to the force acting on a current-carrying conductor placed in a magnetic field when : a] current in conductor increases ? b] length of the conductor increases ? c] direction of the current and magnetic field are reversed ? d] direction of the current is reversed without changing the direction of magnetic field ?



**Watch Video Solution**

**20.** State the clock rule to determine the polarity of any face of a circular current-carrying loop



**Watch Video Solution**

**21.** What is an electromagnet ? Draw a circuit diagram to show how a soft-iron piece can be transformed into an electromagnet .



**Watch Video Solution**

**22. a]** What is a solenoid ? Draw the patterns of magnetic field lines of a solenoid through which a steady current flows. What does the pattern of field lines the solenoid indicate?

**b]** Write one use of a solenoid .



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**23.** Find the direction of magnetic field due to a current-carrying circular coil held :

[i] Vertically in north-south plane and an observer looking at it from east sees the current to flow in an anticlockwise direction

[ii] Vertically in east-west plane and an observer looking it from south sees the current to flow in an anticlockwise direction .

[iii] Horizontally and an observer looking at it from below sees current to flow in the clockwise direction.



**Watch Video Solution**

**24.** The magnetic field produced by a coil of  $n$  turns, at its centre, is  $n$  times as large as that produced by a single turn. Give reason to justify this statement



**Watch Video Solution**

**25.** How does the strength of the magnetic field at the centre of circular coil of wire depend on [i] the radius of the coil, [ii] the number of turns of wire in the coil, and [iii] the strength of current flowing in the coil ?



**Watch Video Solution**

**26.** What does the divergence of magnetic field lines near the end of a current-carrying straight solenoid indicate ?



**Watch Video Solution**

**27.** List any three differences between an alternating current and a direct current.



**Watch Video Solution**

**28.** Mention any three differences between an electric motor and an electric generator.



**Watch Video Solution**

**29.** List two distinguishing features between overloading and short circuiting .



**Watch Video Solution**

**30.** What is an electric fuse ? What is its role in the electric circuits ? Should it be placed on the neutral wire or on the live wire ? Justify your

answer .



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**31.** List two characteristics of the material used in a fuse wire. Name the material it is made of . A fuse is always connected in series in an electric circuit. Justify this statement giving reason.



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**32.** What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?



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**33.** State the significance of the following devices in domestic circuits :

(i) Main switch (ii) Main fuse (iii) Electricity meter



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**34.** Mention some uses of electromagnets .



**Watch Video Solution**

**35.** Name and state the rule to determine the direction of a force experienced by a straight current-carrying conductor placed in a magnetic field which is perpendicular to it.



**Watch Video Solution**

**36.** State Fleming's left hand rule or motor rule.



**Watch Video Solution**

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**Watch Video Solution**

**38.** List four factors on which the magnitude of the force acting on a current-carrying conductor in a magnetic field depends.



**Watch Video Solution**

**39.** When is the force on a current-carrying conductor placed in a magnetic field maximum ?



**Watch Video Solution**



**40.** A proton beam is moving along the direction of a magnetic field.  
What force acts on the proton beam ?



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**41.** What happens to the force acting on a current-carrying conductor placed in a magnetic field when : a] current in conductor increases ? b] length of the conductor increases ? c] direction of the current and magnetic field are reversed ? d] direction of the current is reversed without changing the direction of magnetic field ?



**Watch Video Solution**

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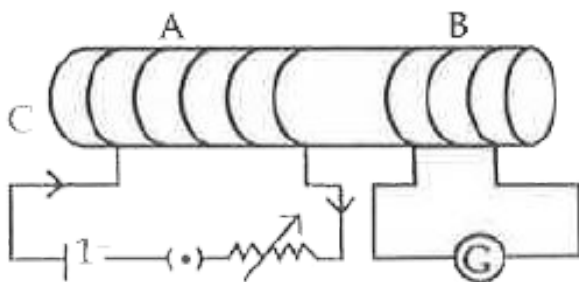
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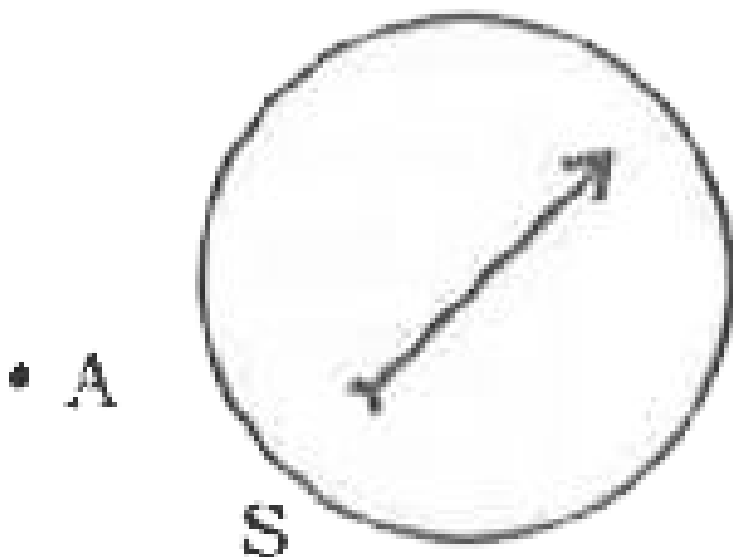
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[Watch Video Solution](#)

47. Explain the mechanical effect produced by an electric current.



[Watch Video Solution](#)

**48.** State the law that helps to determine the direction of magnetic field around a straight current-carrying conductor.



**Watch Video Solution**

**49.** State Fleming's left hand rule or motor rule.



**Watch Video Solution**

**50.** Name the rule which gives the direction of induced current in a conductor .



**Watch Video Solution**

**51.** On what factors do the magnetic field produced by a straight current-carrying conductor depend ?



**Watch Video Solution**

**52.** What change is observed in the deflection of the compass needle placed at a point near a straight current-carrying conductor if the

a] current through the conductor is increased ?

b] direction of current in the conductor is reversed ?

c] compass is moved away from the conductor ?



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**53.** State the clock rule to determine the polarity of any face of a circular current-carrying loop



**Watch Video Solution**

**54.** What is an electromagnet ? Draw a circuit diagram to show how a soft-iron piece can be transformed into an electromagnet .



**Watch Video Solution**

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**Watch Video Solution**

**58.** How does the strength of the magnetic field at the centre of circular coil of wire depend on [i] the radius of the coil, [ii] the number of turns of wire in the coil, and [iii] the strength of current flowing in the coil ?



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**Watch Video Solution**



**60.** List any three differences between an alternating current and a direct current.



**Watch Video Solution**

**61.** Mention any three differences between an electric motor and an electric generator.



**Watch Video Solution**

**62.** List two distinguishing features between overloading and short circuiting .



**Watch Video Solution**

**63.** What is an electric fuse ? What is its role in the electric circuits ? Should it be placed on the neutral wire or on the live wire ? Justify your

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**64.** List two characteristics of the material used in a fuse wire. Name the material it is made of . A fuse is always connected in series in an electric circuit. Justify this statement giving reason.



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**65.** What are the advantages of connecting different electrical appliances in parallel ? Mention any three advantages.



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**66.** State the significance of the following devices in domestic circuits :

(i) Main switch (ii) Main fuse (iii) Electricity meter



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## Additional Question Section Long Answer La Type Questions

1. Explain with the help of a labelled diagram the distribution of magnetic field due to a current through a circular loop. If a current carrying coil has  $n$  turns, why is the field produced at any point  $n$  times the field produced by a single turn ?



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2. Describe the activity to show that a current-carrying conductor experiences a force perpendicular to its length in an external magnetic field.



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3. Describe an activity to obtain magnetic field lines around current-carrying straight conductor.



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4. Name and state the two rules for finding the direction of magnetic field produced by an electric current through a straight conductor.



[Watch Video Solution](#)

5. How does the magnitude of magnetic field depend on the current through a conductor ?



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6. Describe an activity to demonstrate that a bar magnet has a magnetic field around it.



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7. Explain the phenomenon of electromagnetic induction. Describe an experiment to show that a current is set up in a closed loop when an external magnetic field passing through the loop increases or decreases.



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8. With the help of a diagram of an experimental set-up describe an activity to demonstrate that the magnetic field around a straight current-carrying conductor decreases with increase in distance from the conductor .



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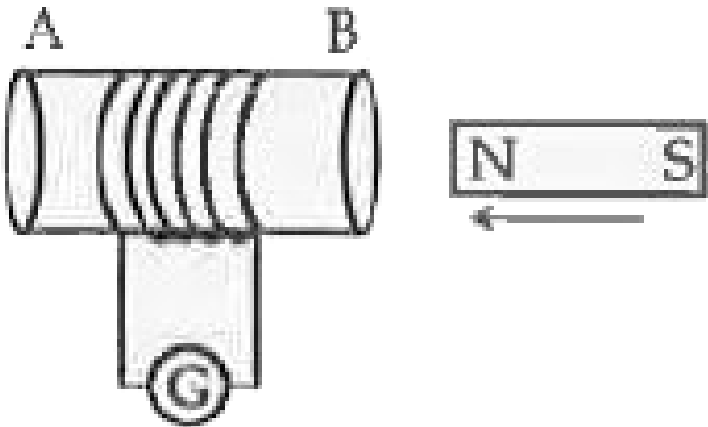
9. With the help of an activity, explain the method of inducing an electric current in a coil with a moving magnet. Mention one practical application of electromagnetic induction.



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10. Observe the given figure .

What type of current is induced in the coil by doing the experiment related to this figure ? Given reason for your answer.



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11. Draw a labelled circuit diagram of a simple electric motor and explain its working . In what way are these simple electric motors different from commercial motors ?



[View Text Solution](#)

**12.** Describe the working of an AC generator with the help of a labelled circuit diagram. What changes must be made in the arrangement to convert it into a DC generator ?



**View Text Solution**

**13.** Draw a schematic diagram of household/domestic wiring . Give its essential features.



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**14. (i)** How does overload and short-circuit occur in an electric circuit ? Explain . What is the function of fuse during this situation ?

**(ii)** Mention two properties of magnetic field lines .



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15. How do you trace the magnetic field lines around a bar magnet using compass needle ? Explain. Write the properties of magnetic field Lines.



**Watch Video Solution**

16. Explain with the help of a labelled diagram the distribution of magnetic field due to a current through a circular loop. If a current carrying coil has  $n$  turns, why is the field produced at any point  $n$  times the field produced by a single turn ?



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17. Describe the activity to show that a current-carrying conductor experiences a force perpendicular to its length in an external magnetic field.



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18. Describe an activity to obtain magnetic field lines around current-carrying straight conductor.



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19. State the rule used to find the direction of this magnetic field.



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20. How does the magnitude of magnetic field depend on the current through a conductor ?



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21. Describe an activity to demonstrate that a bar magnet has a magnetic field around it.



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**22.** Explain the phenomenon of electromagnetic induction. Describe an experiment to show that a current is set up in a closed loop when an external magnetic field passing through the loop increases or decreases.



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**23.** With the help of a diagram of an experimental set-up describe an activity to demonstrate that the magnetic field around a straight current-carrying conductor decreases with increase in distance from the conductor .



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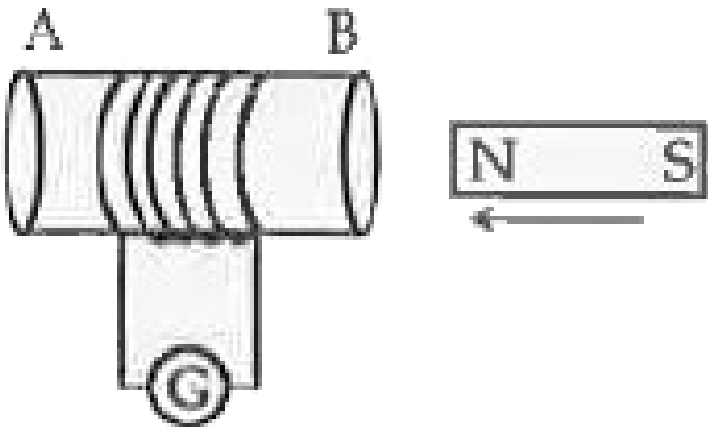
**24.** With the help of an activity, explain the method of inducing an electric current in a coil with a moving magnet. Mention one practical application of electromagnetic induction.



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25. Observe the given figure .

What type of current is induced in the coil by doing the experiment related to this figure ? Given reason for your answer.



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26. Draw a labelled circuit diagram of a simple electric motor and explain its working . In what way are these simple electric motors different from commercial motors ?

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**27.** Describe the working of an AC generator with the help of a labelled circuit diagram. What changes must be made in the arrangement to convert it into a DC generator ?



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**28.** Draw a schematic diagram of household/domestic wiring . Give its essential features.



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**29. (i)** How does overload and short-circuit occur in an electric circuit ? Explain . What is the function of fuse during this situation ?

**(ii)** Mention two properties of magnetic field lines .



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30. How do you trace the magnetic field lines around a bar magnet using compass needle ? Explain. Write the properties of magnetic field Lines.



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### Additional Question Section Higher Order Thinking Skills Hots Questions

1. Which of the following is true ?

- A. Magnetic field exerts a force only on a moving charge.
- B. Magnetic field exerts a force on a charge moving parallel to the direction of the field .
- C. Magnetic field exerts a force on a charge-moving perpendicular to the direction of the field .
- D. All the above

**Answer: A::C::D**



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2. A charged particle passes through a region of a non-uniform magnetic field and emerges out of it. Then, its

A] speed may change but velocity remains same

B] velocity remains same

C] velocity may change but speed remains same



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3. Four particles-proton, electron, alpha, and neutron-enter a region of constant magnetic field with same velocities. The magnetic field is perpendicular to the velocity .

A] Which particle [s] are not be deflected by the magnetic field ?

B] Which particle [s] are deflected by the magnetic field ?

C] Which particle experiences maximum force ? Justify .



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4. The magnetic field due to a current-carrying solenoid is independent of

- A. its number of turns
- B. its length
- C. the current passing through it
- D. all of the above

**Answer: B**



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5. Two circular coils A and B having  $n$  and  $2n$  number of turns have diameters  $2d$  and  $d$ . If they carry the same current.

- A] Which coil produces the maximum magnetic field at the centre ?
- B] Which coil produces the minimum magnetic field at the centre ?



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6. A charged particle placed in a uniform magnetic field experiences :

- A. A force in the direction of the field
- B. A force opposite to the direction of the field
- C. A force perpendicular to the direction of the field
- D. No force at all

**Answer: D**



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7. The strength of the magnetic field around an infinite current carrying conductor is :

- A. is same everywhere around the wire
- B. is different at different points around it and farther from it
- C. is directly proportional to the distance from the wire
- D. none of the above



**Answer: A**



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**8.** Which of the following statement [s] is true ?

A] Electric field and magnetic field are independent

B] Electric field and magnetic field are interrelated

C] Electric field and magnetic field may be produced by a stationary charge .



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**9.** Explain, why electric power is transmitted at low current to distant places .



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10. Two identical-looking bars A and B are given, one of which is definitely magnetised . How would one ascertain whether or not both are magnetised? If only one is magnetised, how does one ascertain which one ?



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11. Which of the following is true ?

- A. Magnetic field exerts a force only on a moving charge.
- B. Magnetic field exerts a force on a charge moving parallel to the direction of the field .
- C. Magnetic field exerts a force on a charge-moving perpendicular to the direction of the field .
- D. All the above

**Answer: A::C::D**



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12. A charged particle passes through a region of a non-uniform magnetic field and emerges out of it. Then, its

A] speed may change but velocity remains same

B] velocity remains same

C] velocity may change but speed remains same

[Watch Video Solution](#)

13. Four particles-proton, electron, alpha, and neutron-enter a region of constant magnetic field with same velocities. The magnetic field is perpendicular to the velocity .

A] Which particle [s] are not be deflected by the magnetic field ?

B] Which particle [s] are deflected by the magnetic field ?

C] Which particle experiences maximum force ? Justify .

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14. The magnetic field due to a current-carrying solenoid is independent of

- A. its number of turns
- B. its length
- C. the current passing through it
- D. all of the above

**Answer: B**



**Watch Video Solution**

15. Two circular coils A and B having  $n$  and  $2n$  number of turns have diameters  $2d$  and  $d$ . If they carry the same current.

- A] Which coil produces the maximum magnetic field at the centre ?
- B] Which coil produces the minimum magnetic field at the centre ?



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**16.** A charged particle placed in a uniform magnetic field experiences :

- A. A force in the direction of the field
- B. A force opposite to the direction of the field
- C. A force perpendicular to the direction of the field
- D. No force at all

**Answer: D**



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**17.** The strength of the magnetic field around an infinite current carrying conductor is :

- A. is same everywhere around the wire
- B. is different at different points around it and farther from it
- C. is directly proportional to the distance from the wire
- D. none of the above

**Answer: A**



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**18.** Which of the following statement [s] is true ?

A] Electric field and magnetic field are independent

B] Electric field and magnetic field are interrelated

C] Electric field and magnetic field may be produced by a stationary charge .



**Watch Video Solution**

**19.** Explain, why electric power is transmitted at low current to distant places .



**Watch Video Solution**

**20.** Two identical-looking bars A and B are given, one of which is definitely magnetised . How would one ascertain whether or not both are magnetised? If only one is magnetised, how does one ascertain which one ?



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