



PHYSICS

NCERT - NCERT PHYSICS(HINGLISH)

MAGNETIC EFFECTS OF ELECTRIC CURRENT SCIENCE

Exercise

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



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2. Draw magnetic field lines around a bar magnet.



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3. What are the magnetic lines of force? Give their important properties.



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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 out the direction of 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) decrease as we move towards its end.

(c) increase as we move towards its end.

(d) is the same at all points.

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: D



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8. Which of the following properties 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

A. mass

B. speed

C. velocity

D. momentum

Answer: C::D



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9. In figure 8, how do we think the displacement of rod AB will be affected if (i) current in the rod AB is increased, (ii) a stronger horse-shoe 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 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

A. towards south

B. towards east

C. downward

D. upward

Answer: D



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11. State Fleming's left-hand 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 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

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 a $2kW$ power rating is operated in a domestic circuit (220 V) that has a current rating of 5A. What results 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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22. 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 centered on the 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: D



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23. The phenomena 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.

- 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: C



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24. The device used for producing electric current is called a:

(a) generator.

(b) galvanometer.

(c) ammeter.

(d) motor.

A. generator

B. galvanometer

C. ammeter

D. motor

Answer: A



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25. The essential difference between an 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.

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: D



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26. At the time of short-circuit, the current in the circuit:

- (a) reduces substantially.
- (b) does not change.

(c) increases heavily.

(d) vary continuously.

A. reduces substantially

B. does not change

C. increases heavily

D. vary continuously

Answer: C



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

(a) An electric motor converts mechanical energy into electrical energy.

(b) An electric generator works on the principle of electromagnetic induction.

(c) The field at the center of a long circular coil carrying current will be parallel straight lines.

(d) A wire with a green insulation is usually the live wire of an electric supply.



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28. State the principle of an electric generator.



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29. A circular loop of radius r carries a current i . How should a long, straight wire carrying a current $4i$ be placed in the plane of the circle so that the magnetic field at the center becomes zero?



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30. What should be done in case a person comes in contact with a live wire?



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31. List three sources of magnetic fields.



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32. How does a solenoid behave like a magnet?

Can you determine the north and south poles

of a current carrying solenoid with a help of bar magnet? Explain.



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



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34. Imagine 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 the magnetic field?



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35. 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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36. Name some devices in which electric motors are used.



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37. A coil of insulated copper wire is connected to galvanometer. What would happen 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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38. Two circular coils A and B are placed close 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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39. 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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40. 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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41. When does an electric short-circuit occur?



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

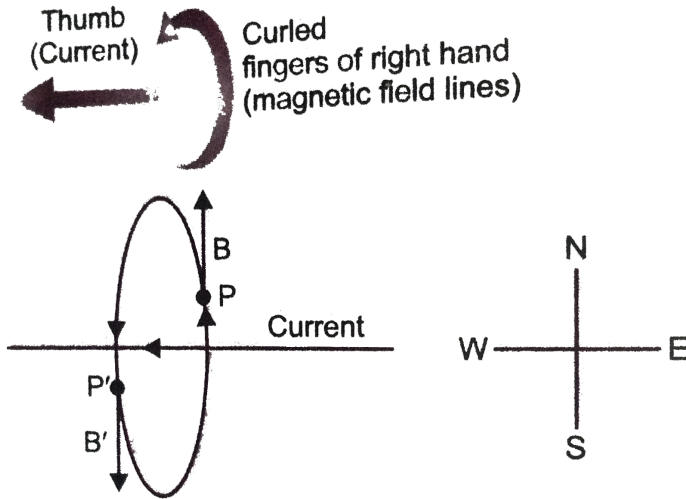


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Solved Examples

1. A current through a horizontal powerline flows in east to west direction. What is the direction of magnetic field at a point directly

below it and a point directly above it?



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2. An electron moving towards the east enters a magnetic field directed towards the north.

The force on the electron will be directed

A. to the right.

B. to the left.

C. out of the page.

D. into the page.

Answer:



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