



PHYSICS

BOOKS - S CHAND PHYSICS

(HINGLISH)

MAGNETIC EFFECT OF ELECTRIC CURRENT

Solved Examples

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



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



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3. 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?

A. Vertically downwards

B. Vertically upwards

C. Towards Right

D. None of these

Answer: A



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4. 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- (ii) withdrawn from inside the coil?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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5. Explain why, the direction of induced current in the coil of an A.C. Generator changes after every half revolution of the coil.



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6. 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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7. A circuit has a fuse of 5 A. What is the maximum number of 100 W (220 V) bulbs that can be safely used in the circuit ?



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



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



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Exercise

1. Give two properties of electric field lines.



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2. What are the two ways in which you can trace the magnetic field pattern of a bar magnet ?



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3. You are given the magnetic field pattern of a magnet. How will you find out from it where the magnetic fields is the strongest ?



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4. State whether the following statement is true or false :

The axis of earth's imaginary magnet and the geographical axis coincide with each other.



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



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6. Where do the manufacturers use a magnetic strip in the refrigerator ? Why is this magnetic strip used ?



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7. Fill in the following blanks with suitable words :

(a) Magnetic field lines leave thepole of a bar magnet and enter at itspole.

(b) The earth's magnetic field is rather like that

of amagnet with itspole in the northern hemisphere.



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8. Draw magnetic field lines around a bar magnet.



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

determined? Mention two important
properties of magnetic field lines.



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



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11. Draw magnetic field lines around a bar magnet.



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12. (a) Define magnetic field lines. Describe an activity to draw a magnetic field line outside a bar magnet from one pole to another pole.

(b) Explain why, a freely suspended magnet always points in the north-south direction.



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13. A strong bar magnet is placed vertically above a horizontal wooden board. The magnetic lines of force will be :

A. only in horizontal plane around the magnet

B. only in vertical plane around the magnet

C. in horizontal as well as in vertical planes around the magnet

D. in all the planes around the magnet

Answer: D



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14. Draw magnetic field lines around a bar magnet.

A. originate from the south pole and end at its north pole

B. originate from the north pole and end at its east pole

C. originate from the north pole and end at its south pole

D. originate from the south pole and end at its west pole

Answer: C



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15. Which of the following is not attracted by a magnet ?

A. steel

B. cobalt

C. brass

D. nickel

Answer: C



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16. The magnetic field lines :

A. intersect at right angles to one another

B. intersect at an angle of 45° to each other

C. do not cross one another

D. cross at an angle of 60° to one another.

Answer: C



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17. The north pole of earth magnet is in the :

A. geographical south

B. geographical east

C. geographical west

D. geographical north

Answer: A



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18. The axis of earth's magnetic field is inclined with the geographical axis at an angle of about :

A. 5°

B. 15°

C. 25°

D. 35°

Answer: B



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19. The shape of the earth magnetic field resembles that of an imaginary :

- A. U-shaped magnet
- B. Straight conductor carrying current
- C. Current-carrying circular coil
- D. Bar magnet

Answer: D



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20. A magnet attracts :

- A. plastics

B. any metal

C. aluminium

D. iron and steel

Answer: D



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21. A plotting compass is placed near the south pole of a bar magnet. The pointer of plotting compass will :

- A. point away fromt the south pole
- B. point parallel to the south pole
- C. point towards the south pole
- D. point at right angles to the south pole

Answer: C



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22. The metallic pointer of a plotting compass gets deflected only when it is placed near a bar magnet because the pointer has :

- A. electromagnetism
- B. permanent magnetism
- C. induced magnetism
- D. ferromagnetism

Answer: B



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23. Choose the incorrect statement from the following regarding magnetic lines of field:

A. The direction of magnetic field at a point is taken to be the direction in which the north pole of a magnetic compass needle points.

B. Magnetic field lines are closed curves

C. If magnetic field lines are parallel and equidistant, they represent zero field strength

D. Relative strength of magnetic field is shown by the degree of closeness of the

field lines

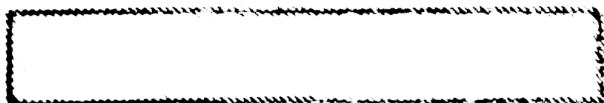
Answer: C



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24. Copy the figure given below which shows a plotting compass and a magnet. Label the N pole of the magnet and draw the field line on

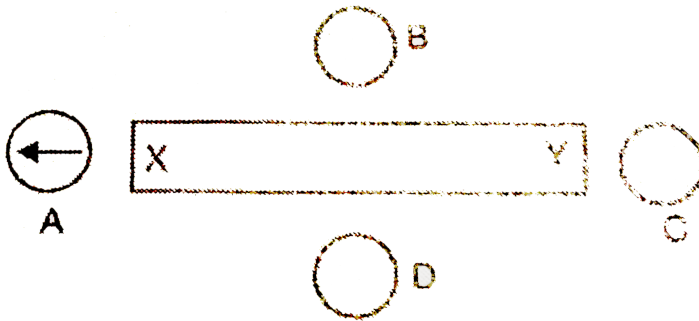
which the compass lies.



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25. (a) The diagram shows a bar magnet surrounded by four potting compasses. Copy the diagram and mark in it the direction of the compass needle for each of the case B, C and

D.



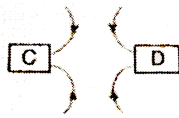
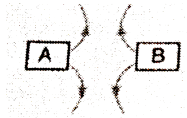
(b) Which is the north pole, X or Y ?



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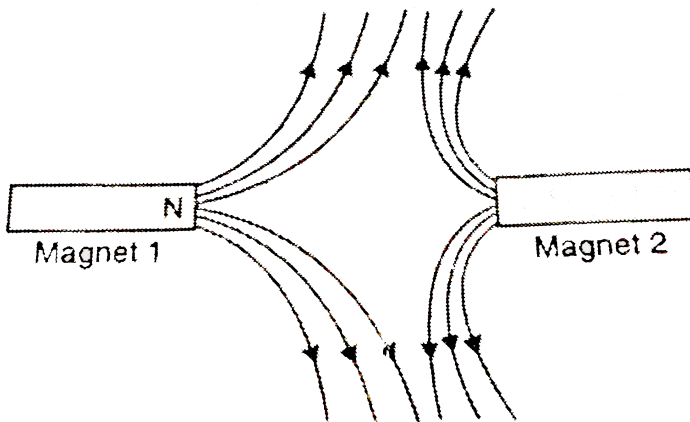
26. The three diagrams in the following figure show the lines of force (field lines) between the poles of two magnets. Identify the poles A,

B, C, D, E and F.



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27. The figure given below shows the magnetic field between two magnets :



(i) Copy the diagram and label the other poles

of the magnets.

(ii) Which is the weaker magnet ?



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28. Which effect of current can be utilised in detecting a current-carrying wire concealed in a wall ?



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29. State qualitatively the effect of inserting an iron core into a current-carrying solenoid.



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30. Draw the magnetic field lines around a straight conductor carrying current. Name and state the rule to find the direction of magnetic field.



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31. What is the other name of Maxwell's right-hand thumb rule ?



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32. State whether the following statement is true or false :

The magnetic field inside a long circular coil carrying current will be parallel straight lines.



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33. What is the shape of a current-carrying conductor whose magnetic field pattern resembles that of a bar magnet ?



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34. State three ways in which the strength of an electromagnet can be increased.



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35. Fill in the following blanks which suitable words :

(a) The lines ofround a straight current-carrying conductor are in the shape of

(b) For a current-carrying solenoid, the magnetic field is like that of a

(c) The magnetic effect of a coil can be increased by increasing the number of, increasing the, or inserting an core.

(d) If a coil is viewed from one end and the current flows in an anticlockwise direction,

then this end is a pole.

(e) If a coil is viewed from one end, and the current flows in a clockwise direction, then this end is a pole.



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36. What is the other name of Maxwell's right-hand thumb rule ?



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37. What for do we apply clock-rule?



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38. State and explain the Clock face rule for determining the polarities of a circular wire carrying current.



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39. Name any two factors on which the strength of magnetic field produced by a current-carrying solenoid depends. How does it depend on these factors ?



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40. (a) Draw a circuit diagram to show how a soft iron piece can be transformed into an electromagnet.

(b) Describe how an electromagnet could be

used to separate copper from iron in a scrap yard.



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41. (a) How does an electromagnet differ from a permanent magnet ?

(b) Name two devices in which electromagnets are used and two devices where permanent magnets are used.



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42. The strength of the magnetic field between the poles of an electromagnet would be unchanged if :

A. current in the electromagnet winding were doubled

B. direction of current in electromagnet winding were reversed

C. distance between the poles of electromagnet were doubled

D. material of the core of electromagnet
were changed

Answer: B



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43. The diagram given below represents magnetic field caused by a current-carrying

conductor which is :



- A. a long straight wire
- B. a circular coil
- C. a solenoid
- D. a short straight wire

Answer: B



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44. 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: D



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45. 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 entered on the wire.

Answer: D



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46. The north-south polarities of an electromagnet can be found easily by using :

A. Fleming's right-hand rule

B. Fleming's left-hand rule

C. Clock face rule

D. Left-hand thumb rule

Answer: C



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47. The direction of electric current in a solenoid when viewed from a particular end is anticlockwise, then this end of solenoid will be :

A. north pole

B. east pole

C. south pole

D. west pole

Answer: A



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48. The direction of electric current in a solenoid when viewed from a particular end is

anticlockwise, then this end of solenoid will be

:

A. west pole

B. south pole

C. north pole

D. east pole

Answer: C



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49. Which of the following is most suitable for the core of electromagnets?

A. soft iron

B. brass

C. aluminium

D. steel

Answer: A



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50. Magnetic effect of current was discovered by

A. Maxwell

B. Fleming

C. Oersted

D. Faraday

Answer: C



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51. A soft iron bar is inserted inside a current-carrying solenoid. The magnetic field inside the solenoid :

- A. will decrease
- B. will increase
- C. will become zero
- D. will remain the same

Answer: B



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52. The magnetic field lines in the middle of the current-carrying solenoid are :

A. circles

B. spirals

C. parallel to the axis of the tube

D. perpendicular to the axis of the tube

Answer: C



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53. The front face of a circular wire carrying current behaves like a north pole. The direction of current in this face of the circular wire is :

A. clockwise

B. downwards

C. anticlockwise

D. upwards

Answer: C



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54. The back face of a circular loop of wire is found to be south magnetic pole. The direction of current in this face of the circular loop of wire will be :

A. towards south

B. clockwise

C. anticlockwise

D. towards north

Answer: B



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55. In the straight wire A, current is flowing in the vertically downward direction whereas in wire B the current is flowing in the vertically upward direction. What is the direction of magnetic field :

(a) in wire A ?

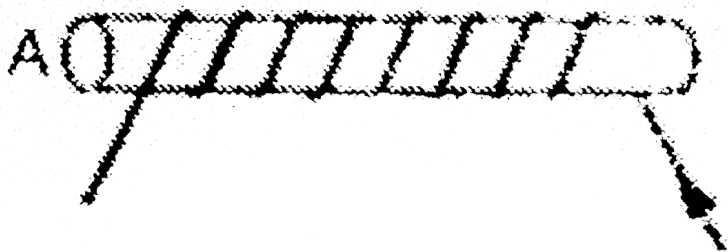
(b) in wire B ?

Name the rule which you have used to get the answer.



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56. The figure shows a solenoid wound on a core of soft iron. Will the end A be a N pole or S pole when the current flows in the direction shown ?



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57. A current-carrying straight wire is held in exactly vertical position. If the current passes through this wire in the vertically upward direction, what is the direction of magnetic field produced by it ? Name the rule used to find out the direction of magnetic field.

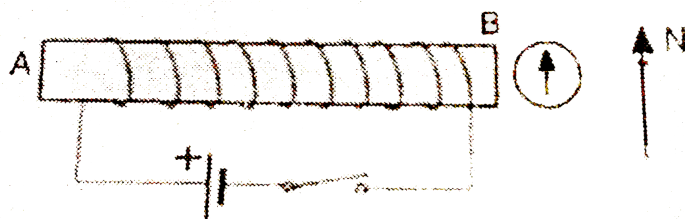


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58. For the coil in the diagram below, when the switch is pressed :

(a) what is the polarity of end A ?

(b) which way will the compass point then ?



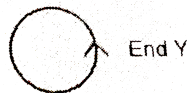
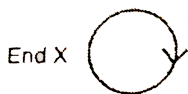
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59. A current flows downwards in a wire that passes vertically through a table top. Will the magnetic field lines around it go clockwise or anticlockwise when viewed from above the table ?



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60. The directions of current following in the coil of an electromagnet at its two ends X and Y are as shown below :



- (a) What is the polarity of end X ?
- (b) What is the polarity of end Y ?
- (c) Name and state the rule which you have used to determine the polarities.



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61. A current-carrying conductor is held in exactly vertical direction. In order to produce a clockwise magnetic field around the conductor, the current should be passed in the conductor :

A. from top towards bottom

B. from left towards right

C. from bottom towards top

D. from right towards left

Answer: A



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62. A thick wire is hanging from a wooden table. An anticlockwise magnetic field is to be produced around the wire by passing current through this wire by using a battery. Which terminal of the battery of the battery should be connected to the :

(a) top end of wire ?

(b) bottom end of wire ?

Give reason for your choice.



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63. What produces magnetism in the human body ?



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64. What is the full form of MRI ?



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



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



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67. In a statement of Fleming's left-hand rule, what do the following represent ?

(a) direction of centre finger.

(b) direction of forefinger.

(c) direction of thumb.



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68. Name one device which works on the magnetic effect of current.



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69. Name the device which converts electrical energy into mechanical energy.



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70. A motor converts one form of energy into another. Name the two forms.



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71. State whether the following statement is true or false :

An electric motor converts mechanical energy into electrical energy.



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72. For Fleming's left-hand rule, write down the three things that are 90° to each other, and next to each one write down the finger or thumb that represents it.





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73. What is the other name of the split ring used in an electric motor ?



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74. Of what substance are the brushes of an electric motor made ?



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75. In an electric motor, which of the following remains fixed and which rotates with the coil ?

Commutator , Brush



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



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77. Fill in the following blanks with suitable words :

(a) Fleming's Rule for the motor effect uses the hand.

(b) A motor contains a kind of switch called a which reverses the current every half



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78. (a) A current-carrying conductor is placed perpendicularly in a magnetic field. Name the rule which can be used to find the direction of force acting on the conductor.

(b) State two ways to increase the force on a current-carrying conductor in a magnetic field.

(c) Name one device whose working depends on the force exerted on a current-carrying coil placed in a magnetic field.



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79. State Fleming's left-hand rule.



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80. What is the principle of an electric motor ?

Name some of the devices in which electric motors are used.



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81. (a) In a d.c. motor, why must the current to the coil be reversed twice during each rotation ?

(b) What device reverses the current ?



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82. (a) State what would happen to the direction of rotation of a motor if :

(i) the current were reversed

(ii) the magnetic field were reversed

(iii) both current and magnetic field were reversed simultaneously.

(b) In what ways can a motor be made more powerful ?



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83. (a) What is an electric motor ? With the help of a labelled diagram, describe the working of a simple electric motor.

(b) What are the special features of commercial electric motors ?



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84. In an electric motor, the direction of current in the coil changes once in each :

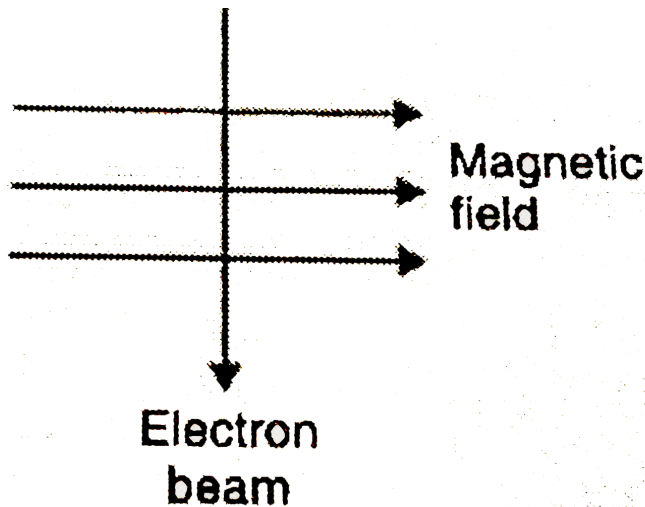
- A. two rotations
- B. one rotation
- C. half rotation
- D. one-fourth rotation

Answer: C



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85. An electron beam enters a magnetic field right angles to it as shown in the Figure.



The direction of force acting on the electron beam will be :

A. to the left

B. to the right

C. into the page

D. out of the page

Answer: C



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86. The force experienced by a current-carrying wire placed in a magnetic field is zero when the angle between the wire and the direction of magnetic field is :

A. 45°

B. 60°

C. 90°

D. 180

Answer: D



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87. The force experienced by a current-carrying wire placed in a magnetic field is zero when

the angle between the wire and the direction of magnetic field is :

A. 45°

B. 60°

C. 90°

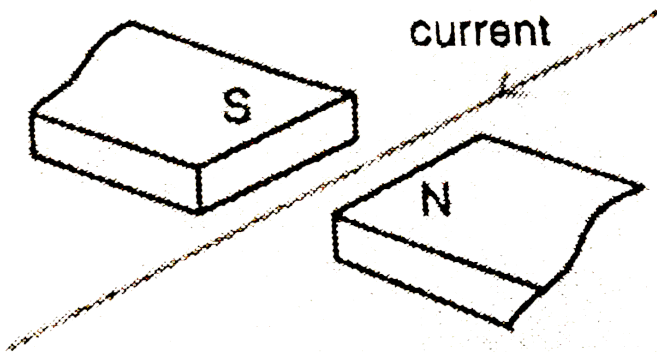
D. 180°

Answer: D



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88. A current flows in a wire running between the S and N poles of a magnet lying horizontally as shown in Figure below :



The force on the wire due to the magnet is directed :

A. from N to S

B. from S to N

C. vertically downwards

D. vertically upwards

Answer: C



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89. A electric motor is a device which transforms :

A. mechanical energy to electrical energy

B. heat energy to electrical energy

C. electrical energy to heat energy only

D. electrical energy to mechanical energy

Answer: D



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90. A magnetic field exerts no force on

A. an electric charge moving perpendicular
to its direction

B. an unmagnetised iron bar

C. a stationary electric charge

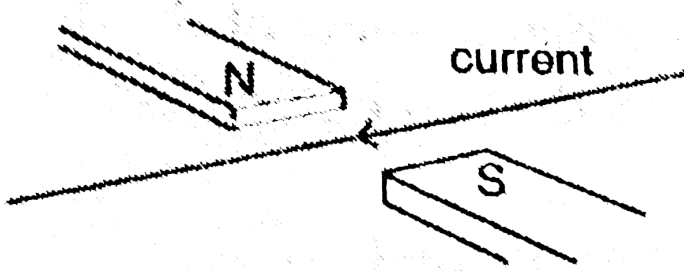
D. a magnet

Answer: C



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91. A horizontal wire carries a current as shown as shown in Figure below between magnetic poles N and S :



Is the direction of the force on the wire due to the magnet :

- A. in the direction of the current
- B. vertically downwards
- C. opposite to the current direction
- D. vertically upwards

Answer: D



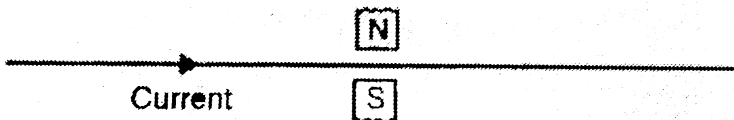
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92. If the current in a wire is flowing in the vertically downward direction and a magnetic field is applied from west to east, what is the direction of force on the wire ?



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93. Which way does the wire in the diagram below tend to move ?





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94. Name the device which converts mechanical energy into electric energy.



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95. Out of an A.C. generator and a D.C. generator :

(a) which one uses a commutator (split rings)

?

(b) which one uses slip rings ?



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96. Name the phenomenon which is made use of in an electric generator.



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97. Name the rule which gives the direction of induced current?



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98. What condition is necessary for the production of current by electromagnetic induction ?



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99. What is the basic difference in the design of an a.c. generator and d.c. generator ?



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100. What is the function of brushes in an electric generator ?



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101. When a wire is moved up and down in a magnetic field, a current is induced in the wire. What is this phenomenon known as ?



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102. When current is 'switched on' and 'switched off' in a coil, a current is induced in another coil kept near it. What is this phenomenon known as ?



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103. What is the major difference between the simple alternator and most practical alternators ?



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104. List three sources of magnetic fields.



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105. 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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106. (a) What is the difference between alternating current and direct current ?

(b) What type of current is given by (i) a dry cell, and (ii) a Power House generator ?



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107. State and explain Fleming's right hand rule.



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108. 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: C



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109. The phenomenon of electromagnetic induction is :

A. the process of charging a body.

B. the process of generating magnetic field
due to 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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110. The device used for producing electric current is called a :

A. generator

B. galvanometer

C. ammeter

D. motor

Answer: A



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111. 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 generated will generate a higher voltage.

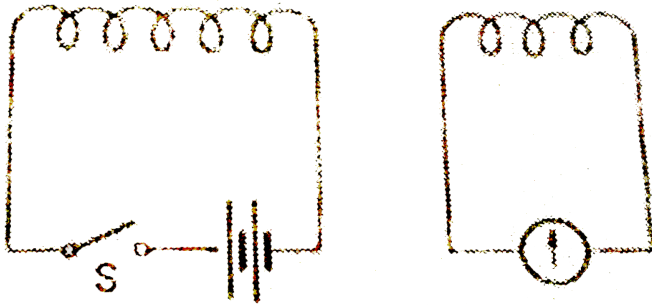
D. AC generated has slip rings while the DC generator has a commutator.

Answer: D



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112. When the switch S is closed in the figure given below, the pointer of the galvanometer moves to the right.



If S is kept closed, pointer will :

- A. return to zero
- B. stay over on the right
- C. move to the left and stay there

D. move to and fro until S is opened

Answer: A



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113. Each one of the following changes will increase emf (or voltage) in a simple generator except :

A. increasing the number of turns in the armature coil

- B. winding the coil on a soft iron armature
- C. increasing the size of the gap in which the armature turns
- D. increasing the speed of rotation

Answer: C



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114. An electric generator converts :

- A. electrical energy into mechanical energy

B. mechanical energy into chemical energy

C. mechanical energy into electrical energy.

D. None

Answer: C



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115. A d.c. generator is based on the principle of

:

A. electrochemical induction

B. electromagnetic induction

C. magnetic effect of current

D. heating effect of current

Answer: B



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116. An induced emf is produced when a magnet is plunged into a coil. The magnitude of the induced emf is independent of

A. the speed with which the magnet is moved

B. the number of turns of the coil

C. the resistivity of turns of the coil

D. the strength of the magnet

Answer: C



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117. The frequency of direct current (d.c.) is :

A. 0 Hz

B. 50 Hz

C. 60 Hz

D. 100 Hz

Answer: A



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118. The frequency of alternating current (a.c.) supply in India is :

A. 0 Hz

B. 50 Hz

C. 60 Hz

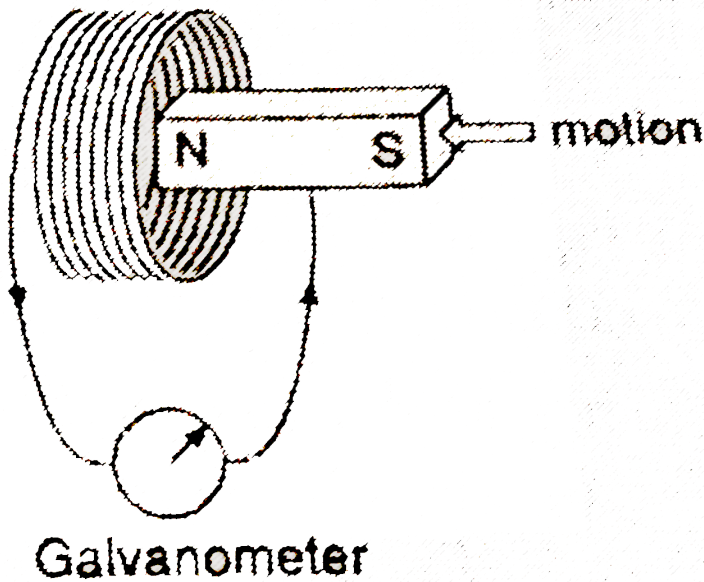
D. 100 Hz

Answer: A



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119. When the magnet shown in the diagram below is moving towards the coil, the galvanometer gives a reading to the right.



- (i) What is the name of the effect being produced by the moving magnet ?
- (ii) State what happens to the reading shown on the galvanometer as the magnet is moved away from the coil.
- (iii) The original experiment is repeated. This time the magnet is moved towards the coil at

a great speed.

State two change you would notice in the reading on the galvanometer.



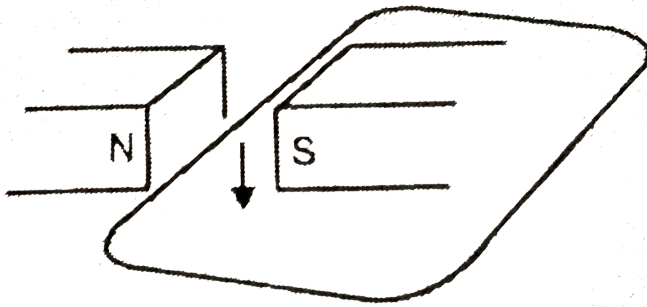
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120. If you hold a coil of wire next to a magnet, no current will flow in the coil. What else is needed to induce a current ?



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121. The wire in Figure below is being moved downwards through the magnetic field so as to produce induced current.



What would be the effect of :

- (a) moving the wire at a higher speed?
- (b) moving the wire upwards rather than downwards ?
- (c) using a strong magnet ?

(d) holding the wire still in the magnetic field?

(e) moving the wire parallel to the magnetic field line ?



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122. Two coils A and B of insulated to wire are kept close to each other. Coil A is connected to a galvanometer while coil B is connected to a battery through a key . What would happen if :

(i) a current is passed through coil B plugging the key ?

(ii) the current is stopped by removing the plug from the key ?

Explain your answer mentioning the name of the phenomenon involved.



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123. A portable radio has a built in transformer so that it can work from the mains instead of batteries. Is this a step - up or step down transformer ?



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124. What name is given to the device which automatically cuts off the electricity supply during short-circuiting in household wiring ?



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125. What is the capacity of an electric fuse used in (i) lighting circuit (ii) power circuit in household supply?



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126. Given the symbol of an electric fuse used in circuit diagrams.



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127. State whether the following statements are true or false:

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

(b) A miniature circuit breaker (MCB) works on the heating effects of current .



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128. What is the advantage of the third wire of each connection in domestic appliances?



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129. List the colours of the three wires in the cable connected to the plug of an electric iron.



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130. If fuse of 250 mA, 500 mA, 1 A, 5 A, and 10 A were available, which one would be the most suitable for protecting an amplifier short circuit of the most suitable for protecting an amplifier rated at 240 V, 180 W?



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131. When does an electric short-circuit occur?



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132. In which wire in a A.C. Housing circuit is the switch introduced to operate the lights?



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133. In household circuits, is a fuse wire connected in series or in parallel ?



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134. Give two reasons why different electrical appliances in a domestic circuit are connected in parallel.



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135. What is the usual colour of the insulation of : (a) live wire, (b) neutral wire, and (c) earth wire ?



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136. What is the main purpose of earthing an electrical appliance ?



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137. Give two reasons why different electrical appliances in a domestic circuit are connected in parallel.



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138. How should the electric lamps in a building be connected so that the switching on or off in a room has no effect on other lamps in the same building ?



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139. Fill in the following blanks with suitable words :

(a) A fuse should always be placed in thewire of a mains circuit.

(b) The earth wire should be connected to theof an appliance.



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140. (a) Of what substance is the fuse wire made ? Why ?

(b) Explain why, a copper wire cannot be used as a fuse wire.



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141. What type of elastic fuse is used in electrical appliances like car stereos ? Explain with the help of a labelled diagram.



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142. Distinguish between the terms 'overloading' and 'short-circuiting' as used in domestic circuits.



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143. (a) When does a fuse cut off current ? How does it do it ?

(b) What is the maximum number of 60 W bulbs that can be run from the mains supply of 220 volts if you do not want to overload a 5 A fuse ?



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144. Explain the importance of using in a household electric circuit (i) fuse, and (ii) earthing wire.



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145. (a) An electric iron is rated at 230 V, 750 W. Calculate (i) the maximum current, and (ii) the number of units of electricity it would use in 30 minutes.

(b) Which of the following fuse ratings would be suitable for this electric iron ?

1 A, 3 A, 5 A, 13 A



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146. What is the function of an earth wire?

Why is it necessary to earth metallic appliances?



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147. (a) What current is taken by a 3 kW electric geyser working on 240 V mains ?

(b) What size fuse should be used in the geyser circuit ?



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148. A 1.25 kW heater works on a 220 V mains supply. What current rating would a suitable fuse have ?

A. 2 A

B. 5 A

C. 10 A

D. 13 A

Answer: C



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149. The maximum number of 40 W tube-lights connected in parallel which can safely be run from a 240 V supply with a 5 A fuse is :

- A. 5
- B. 15
- C. 20
- D. 30

Answer: D



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150. In normal use, a current of 3.5 A flows through a hair dryer. Choose a suitable fuse from the following :

A. 3 A

B. 5 A

C. 10 A

D. 30 A

Answer: B



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151. Which one of the following statements is not true ?

A. In a house circuit, lamps are used in parallel.

B. Switches, fuses and circuit breaks should be placed in the neutral wire

C. An electric iron has its earth wire connected to the metal case to prevent the user receiving a shock

D. When connecting a three-core cable to a

13 A three-pin plug, the red wire goes to

the live pin

Answer: B



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152. A car headlamp of 48 W works on the car battery of 12 V. The correct fuse for the circuit of this car headlamp will be :

A. 5 A

B. 10 A

C. 3 A

D. 13 A

Answer: A



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153. A 3-pin mains plug is fitted to the cable for a 1 kW electric kettle to be used on a 250 V a.c.

supply. Which of the following statement is not correct ?

- A. The fuse should be fitted in the live wire
- B. A 13 A fuse is the most appropriate value to use
- C. The neutral wire is coloured black
- D. The green wire should be connected to the earth pin.

Answer: B



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154. A T.V. set consumes an electric power of 230 watts and runs on 230 volts mains supply. The correct fuse for this TV set is :

A. 5 A

B. 3 A

C. 1 A

D. 2 A

Answer: D



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155. An MCB which cuts off the electricity supply in case of short-circuiting or overloading works on the :

- A. chemical effect of current
- B. heating effect of current
- C. magnetic effect of current
- D. electroplating effect of current

Answer: C



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156. An air-conditioner of 3.2 kW power rating is connected to a domestic electric circuit having a current rating of 10 A. The voltage of power supply is 220 V. What will happen when this air-conditioner is switched on ? Explain your answer.



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157. Three appliances are connected in parallel to the same source which provides a voltage of 220 V. A fuse connected to the source will blow if the current from the source exceeds 10 A. If the three appliances are rated at 60 W, 500 W and 1200 W at 220 V, will the fuse blow ?



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158. A vacuum cleaner draws a current of 2 A from the mains supply

(a) What is the appropriate value of the fuse to be fitted in its circuit ?

(b) What will happen if a 13 A fuse is fitted in its circuit ?



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159. An electric kettle rated as 1200 W at 220 V and a toaster rated at 1000 W at 220 V are

both connected in parallel to a source of 220 V. If the fuse connected to the source blows when the current exceeds 9.0 A, can both appliances be used at the same time ? Illustrate your answer with calculations.



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160. What is the main difference in the wiring of an electric bulb and a socket for using an electric iron in a domestic electric circuit ? What is the reason for this difference ?



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161. A domestic lighting circuit has a fuse of 5 A. If the mains supply is at 230 V, calculate the maximum number of 36 W tube-lights that can be safely used in the circuit.



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



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163. Draw magnetic field lines around a bar magnet.



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164. List the properties of magnetic lines of force.



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



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



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168. 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: D



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169. 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

Answer: C::D



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170. 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

Answer: D



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171. State Fleming's left-hand rule.



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172. What is the principle of an electric motor?



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



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



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175. State the principle of an electric generator.



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176. Name some sources of direct current.



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177. Which sources produce alternating current?



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178. 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: A



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



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



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182. 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

Answer: D



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

A. generator

B. galvanometer

C. ammeter

D. motor

Answer: A



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184. 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 generated will generate a higher voltage.

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

Answer: D



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185. 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: C



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186. 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 centre of a long circular coil carrying current will be parallel straight lines.

(d) A wire with a green insulation is usually the live wire.



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187. List three sources of magnetic fields.



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



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190. 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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191. 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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192. Name some devices in which electric motors are used.



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193. 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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194. 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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195. 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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196. 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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197. When does an electric short-circuit occur?



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198. What is the function of an earth wire?

Why is it necessary to earth metallic appliances?



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Long Answer Type Questions

1. (a) What is a solenoid ? Draw a sketch to show the magnetic field pattern produced by a current-carrying solenoid.

(b) Name the type of magnet with which the magnetic field pattern of a current-carrying solenoid resembles.

(c) What is the shape of field lines inside current-carrying solenoid ? What does the pattern of field lines inside a current-carrying solenoid indicate ?

(d) List three ways in which the magnetic field strength of a current-carrying solenoid can be increased ?

(e) What type of core should be put inside a current-carrying solenoid to make an electromagnet ?



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2. (a) What do you understand by the term "electromagnetic induction"? Explain with the help of a diagram. It Brgt (b) Name one devices which works on the phenomenon of electromagnetic induction.
- (c) Describe different ways to induce current in a coil of wire.



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Questions Based On High Order Thinking Skills

1. The magnetic field associated with a current-carrying conductor is in anticlockwise direction. If the conductor was held along the east-west direction, what will be the direction of current through it ? Name and state the rule applied to determine the direction of current ?



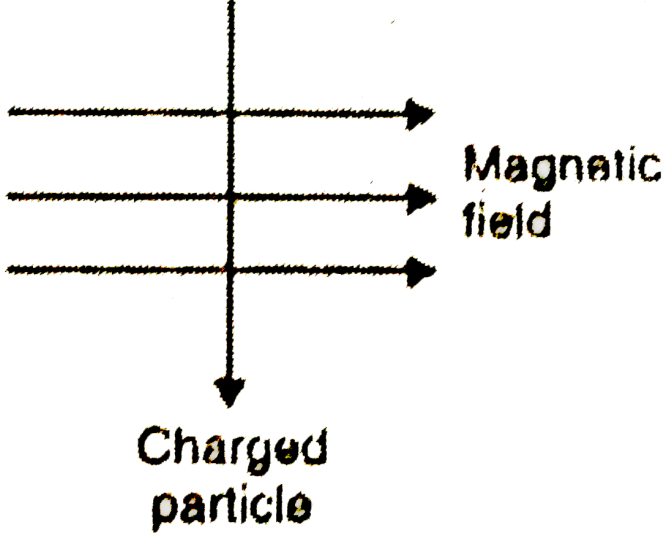
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2. What is the force on a current-carrying wire that is parallel to a magnetic field ? Give reason for your answer.



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3. A charged particle enters at right angles into a uniform magnetic field as shown :



What should be the nature of charge on the particle if it begins to move in a direction pointing vertically out of the page due to its interaction with the magnetic field ?



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4. A coil is connected to a galvanometer. When the N-pole of a magnet is pushed into the coil, the galvanometer deflected to the right. What deflection, if any, is observed when:

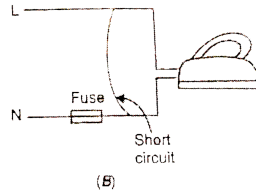
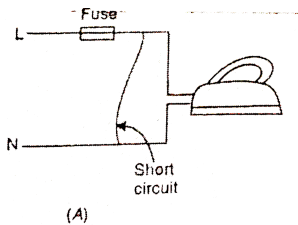
- (a) the N-pole is removed ?
- (b) the S-pole is inserted ?
- (c) the magnet is at rest in the coil ?

State three ways of increasing the deflection on the galvanometer.



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5. Which of the following circuits will still be dangerous even if the fuse blows off and electric iron stops working during a short circuit ?



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6. (a) Explain why, it is more dangerous to touch the live wire of a mains supply rather than the neutral wire.

(b) Why is it safe for birds to sit on naked power lines fixed atop tall electric poles ?



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Very Short Answer Type Questions

1. What type of generator is used at Power Stations ?



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2. State whether the following statements are true or false :

(a) A generator works on the principle of electromagnetic induction.

(b) A motor on the principle of electromagnetic induction.



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3. Why are Thermal Power Stations usually located near a river ?





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4. Complete the following sentence :

A generator with commutator products
current.



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5. What is the electric potential of the neutral
wire in a main supply cable



[View Text Solution](#)

Short Answer Type Questions

1. Name and state the rule to find the direction of :

(a) current induced in a coil due to its rotation in a magnetic field.

(b) force experienced by a current-carrying straight conductor placed in a magnetic field which is perpendicular to it.



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2. (a) In which respect does the construction of an A.C generator differ from that of a D.C. generator ?

(b) What normally drives the alternators in a Thermal Power Station ? What fuels can be used to heat water in the boiler ?



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3. (a) Why are fuses fitted in the fuse box of a domestic electricity supply ?

(b) What device could be used in place of the fuses ?



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Multiple Choice Questions

1. The north pole of a long bar magnet was pushed slowly into a short solenoid connected to a galvanometer. The magnet was held stationery for a few seconds with the north pole in the middle of the solenoid and then

withdrawn rapidly. The maximum deflection of the galvanometer was observed when the magnet was :

- A. moving towards the solenoid
- B. moving into solenoid
- C. at rest inside the solenoid
- D. moving out of the solenoid

Answer: D



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2. 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: C



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3. Circuit Breaker Device which can be used in place of fuse in domestic electric wiring is called :

A. CBD

B. DCB

C. MCD

D. MCB

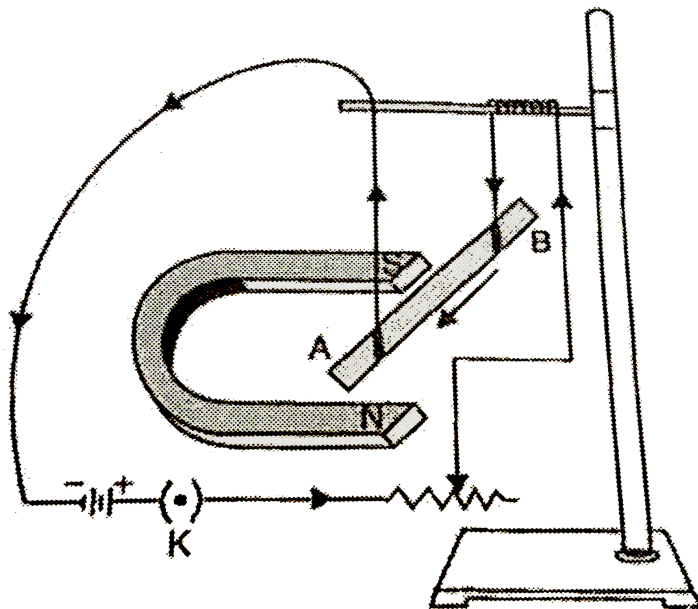
Answer: D



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1. A small aluminium rod AB is suspended horizontally from a stand by the ends of two connecting wires as shown in the Figure given here. A horseshoe magnet is placed in such a way that north pole of the magnet is vertically below and its south pole vertically above the aluminium rod. The aluminium rod is connected in series with a battery, a key and a rheostat. How do you think the displacement of rod AB will be affected if :

- (i) current in rod AB is increased ?
- (ii) a stronger horseshoe magnet is used ?
- (iii) length of the rod AB is increased ?



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2. The phenomenon of electromagnetic inductions 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: C



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