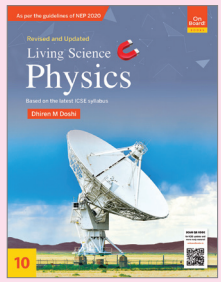
ICSE Living Science PHYSICS

Class 10



Multiple-Choice Questions

Chapter 10: ELECTROMAGNETISM

1. Which of the following correctly defines a magnetic field?
   (a) It exists in a region around a current-carrying conductor.
   (b) It exists in a region far from a current-carrying conductor.
   (c) It exists only in the region over a current-carrying conductor.
   (d) It exists only in the region under a current-carrying conductor.
   Ans: (a)

2. Which of the following statements correctly describes the nature of magnetic field line?
   (a) They emerge from S-pole, pass through the surrounding medium and re-enter the N-pole.
   (b) They emerge from N-pole, pass through the surrounding medium and re-enter the S-pole.
   (c) They emerge from N-pole, pass through the surrounding medium and re-enter the N-pole.
   (d) They emerge from S-pole, pass through the surrounding medium and re-enter the S-pole.
   Ans: (b)

3. If the direction of current passing through a wire that is pierced through a cardboard, on which iron filings are kept, is reversed, the direction in which iron filings will arrange themselves will
   (a) remain same as earlier.
   (b) be in the opposite direction.
   (c) depend on the strength of the current.
   (d) depend on the amount of iron filings taken.
   Ans: (b)

4. If the strength of the current in the wire decreases, which of the following changes can be observed in the iron filings surrounding the wire?
   (a) The number of magnetic field lines around the wire increases and space between the magnetic field lines increases.
   (b) The number of magnetic field lines around the wire increases and space between the magnetic field lines decreases.
   (c) The number of magnetic field lines around the wire decreases and space between the magnetic field lines increases.
   (d) The number of magnetic field lines around the wire decreases and space between the magnetic field lines decreases.
   Ans: (c)

5. Which of the following combination of formulas correctly depicts the relationship between the strength of magnetic field (B) and amount of current (I) and distance from the conductor (r)?
   (a) $B \propto I$ and $B \propto r$
   (b) $B \propto (1/I)$ and $B \propto r$
   (c) $B \propto (1/I)$ and $B \propto (1/r)$
   (d) $B \propto I$ and $B \propto (1/r)$
   Ans: (d)

6. According to the Right-hand thumb rule, what does the thumb direction represent?
   (a) Direction of current
   (b) Direction of magnetic field lines
   (c) Normal to the direction of current
   (d) Normal to the direction of magnetic field lines
   Ans: (a)

7. According to the corkscrew rule of Maxwell, if the direction of advancement of the screw represents the direction of current flow, then the direction of the magnetic field lines is given by
   (a) the direction of rotation of the thumb.
   (b) opposite to the direction of rotation of the thumb.
   (c) opposite to the direction of rotation of the screw.
   (d) None of the above.
   Ans: (a)

8. According to Ampere's swimming rule, if a man swims along the conductor, then north of the needle deflects towards his left hand when the direction of current is such that as if it
   (a) enters his head and leaves his feet.
   (b) enters his feet and leaves his head.
   (c) enters his feet and leaves his left hand.
   (d) enters his feet and leaves his right hand.
   Ans: (b)

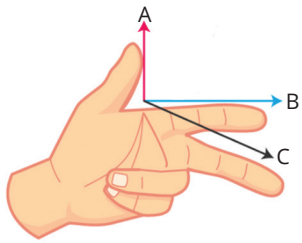
9. The magnetic field lines at the centre in a loop carrying current is
   (a) a circle.
   (b) an ellipse.
   (c) a straight line.
   (d) non-existent.
   Ans: (c)

10. Two solenoids A and B are of equal length and made of same material. The copper wire wound on the solenoid A is of length 10 cm and that on the solenoid B is 20 cm. If the current flowing through both the solenoids is the same, then the magnetic field
   (a) in solenoid A is the same as that in solenoid B.
   (b) in solenoid A is double of that in solenoid B.
   (c) in solenoid A is half of that in solenoid B.
   (d) cannot be compared between A and B from the given data.
   Ans: (c)

11. Which of the following does not increase the strength of an electromagnet?
   (a) Increase in the number of turns of the solenoid.
   (b) Increase in the strength of the current passing through the solenoid.
   (c) Increase in the length of the soft iron bar.
   (d) None of the above
   Ans: (c)

12. The direction of force experienced by a conductor when both electric and magnetic fields are present is
   (a) the same as the direction as the electric current.
   (b) the same as the direction of the magnetic field.
   (c) perpendicular to the magnetic field only.
   (d) perpendicular to both the electric current and the magnetic field.
   Ans: (d)

13. Consider the following as pictorial representation of Fleming's left-hand rule.



Identify A, B and C.

(a) A → Magnetic field; B → Direction of forces acting on the conductor; C → Current
(b) A → Current; B → Direction of forces acting on the conductor; C → Magnetic field
(c) A → Direction of forces acting on the conductor; B → Magnetic field; C → Current
(d) A → Direction of forces acting on the conductor; B → Current; C → Magnetic field

Ans: (c)

14. If a current-carrying conductor is placed parallel to the direction of the magnetic field, the force experienced by the conductor will be

(a) 0 N (b) 50 N (c) 100 N (d) 200 N

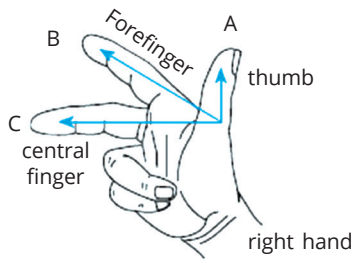
Ans: (a)

15. Which of the following factors is not responsible for the strength of induced current?

(a) Strength of the magnetic field
(b) Number of turns or wire in the coil
(c) Relative speed between the coil and the magnet
(d) Strength of the electric field

Ans: (d)

16. Identify A, B and C in the following pictorial presentation of the Fleming's right-hand rule.



(a) A → Direction of motion of the conductor; B → Magnetic field; C → Direction of induced current
(b) A → Magnetic field; B → Direction of motion of the conductor; C → Direction of induced current
(c) A → Direction of motion of the conductor; B → Direction of induced current; C → Magnetic field
(d) A → Direction of induced current; B → Magnetic field; C → Direction of motion of the conductor

Ans: (a)

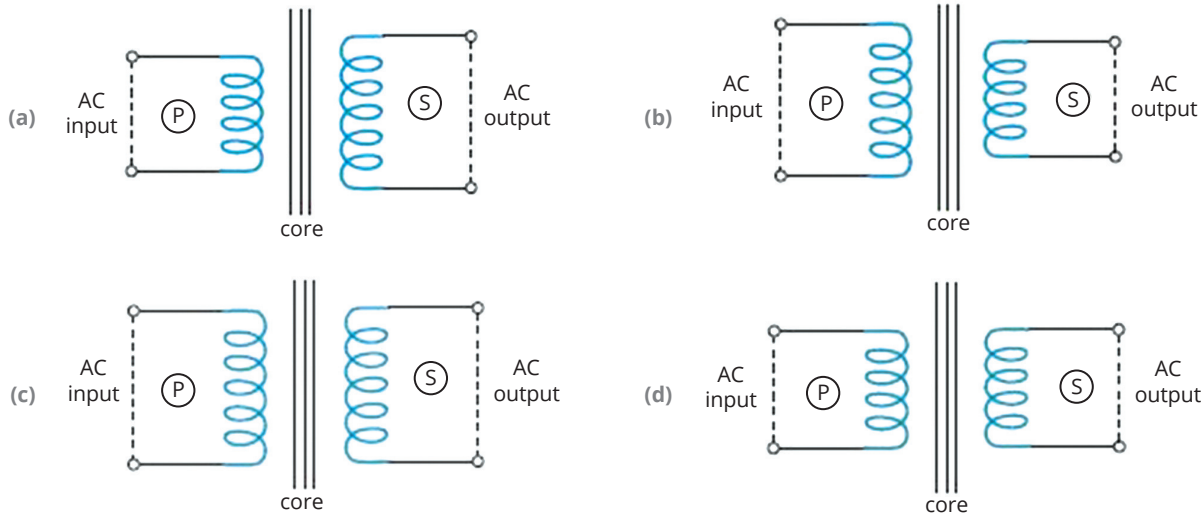
17. Which of the following steps increases the induced current?

(i) Decrease in the speed of rotation of the coil
(ii) Increase in the speed of rotation of the coil
(iii) Decrease in the number of turns in the coil
(iv) Use of coil with large area
(v) Use of weak magnet
(vi) Increase in the number of turns in the coil

(a) (i), (iii), and (iv) only
(b) (ii), (iv), and (v) only
(c) (ii), (iv), and (vi) only
(d) All of these

Ans: (c)

18. Which of the following symbolic diagrams correctly represents a step-up transformer?



Ans: **(a)**

19. A machine that produces electricity by converting mechanical energy into electrical energy is called

(a) transformer.
(b) generator.
(c) solenoid.
(d) moving coil galvanometer.

Ans: **(b)**

20. What is the hysteresis loss?

(a) Energy loss due to hating of copper coils in transformer
(b) Energy loss due to vibration of the core in a transformer
(c) Energy loss due to magnetization and demagnetization of the core
(d) Energy loss as heat due to Eddy current generation

Ans: **(c)**