Chapter 6: Electromagnetism

MCQs:

- 1. The magnetic field is produced by:
- a) Stationary charges
- b) Moving charges
- c) Both stationary and moving charges
- d) Only electric charges

Answer: b)

2. The SI unit of magnetic field is:

- a) Weber
- b) Tesla

c) Coulomb

d) Ampere

Answer: b)

3. The direction of magnetic field around a straight current-carrying conductor can be determined using:

- a) Right-hand rule
- b) Left-hand rule

c) Fleming's left-hand rule

d) Fleming's right-hand rule

Answer: a)

4. The force on a current-carrying conductor placed in a magnetic field depends on:

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- a) The strength of the magnetic field
- b) The length of the conductor
- c) The current passing through the conductor
- d) All of the above

Answer: d)

5. The magnetic field produced by a current-carrying conductor is:

- a) Always radial
- b) Circular
- c) Uniform
- d) Linear
- Answer: b)

6. The force on a current-carrying conductor in a magnetic field is maximum when the angle between the magnetic field and the current is:

- a) 0°
- b) 45° c) 90°
- d) 180°
- Answer: c)

7. The magnetic field produced by a current in a solenoid is similar to that of:

- a) A bar magnet
- b) A straight conductor
- c) An electric field
- d) A dipole
- Answer: a)

8. The direction of the magnetic field around a current-carrying solenoid can be determined using:

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- a) Right-hand thumb rule
- b) Left-hand thumb rule
- c) Ampere's law
- d) Gauss's law **Answer: a)**

9. The force between two parallel current-carrying conductors depends on:

- a) The magnitude of the currents
- b) The distance between the conductors
- c) The length of the conductors
- d) All of the above

Answer: d)

10. The magnetic field inside a solenoid is:

- a) Zero
- b) Uniform
- c) Variable
- d) Radial

Answer: b)

11. In an electric motor, the force on the current-carrying conductor is maximum when:

a) The angle between the conductor and the magnetic field is 0° b) The angle between the conductor and the magnetic field is 90° c) The angle between the conductor and the magnetic field is 45° d) The current is zero Answer: b)

12. Which of the following is used to detect a magnetic field?

- a) Galvanometer
- b) Compass needle
- c) Ammeter
- d) Voltmeter
- Answer: b)

13. The magnetic field at the center of a current-carrying circular loop is:

- a) Zero
- b) Maximum
- c) Minimum
- d) Uniform
- Answer: b)

14. The magnetic force between two parallel current-carrying wires is attractive if the currents are in: A D 1 O

- a) The same direction
- b) Opposite directions
- c) Perpendicular directions
- d) Parallel directions

Answer: a)

15. The phenomenon of electromagnetism was first discovered by:

- a) Ampère
- b) Faraday
- c) Oersted
- d) Maxwell

Answer: c)

16. The magnetic field around a current-carrying wire is:

- a) Radial
- b) Circular
- c) Conical
- d) Linear
- Answer: b)

17. The right-hand rule for a solenoid states that:

a) The thumb points in the direction of the magnetic field

- b) The thumb points in the direction of the current
- c) The fingers point in the direction of the magnetic field

d) The thumb points in the direction of the current, and the fingers curl in the direction of the field

Answer: d)

18. The magnetic force on a charged particle moving in a magnetic field depends on:

- a) The charge of the particle
- b) The velocity of the particle
- c) The angle between the velocity and magnetic field
- d) All of the above

Answer: d)

19. The magnetic field produced by a current-carrying conductor decreases with an increase in:

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- a) Distance from the conductor
- b) Current
- c) Length of the conductor
- d) Strength of the magnetic field

Answer: a)

20. When a current-carrying conductor is placed in a magnetic field, the force acting on it is known as:

- a) Electric force
- b) Magnetic force
- c) Gravitational force
- d) Electromotive force

Answer: b)

21. The phenomenon of electromagnetic induction was discovered by:

- a) Ampère
- b) Faraday
- c) Oersted
- d) Lenz

Answer: b)

22. In a transformer, the number of turns in the primary coil and secondary coil determines:

- a) The efficiency
- b) The power
- c) The voltage
- d) The current
- Answer: c)

23. The direction of induced current can be found using:

- a) Faraday's law
- b) Lenz's law
- c) Ampere's law
- d) Gauss's law
- Answer: b)

24. The efficiency of a transformer is maximized when:

- a) The current in both coils is the same
- b) The voltage in both coils is the same
- c) The resistance is minimized
- d) Both coils are short-circuited

Answer: c)

25. The force on a moving charge in a magnetic field is zero if the velocity of the charge is:

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- a) Perpendicular to the magnetic field
- b) Parallel to the magnetic field
- c) Random
- d) Zero

Answer: b)

26. The magnetic field produced by a current-carrying solenoid is:

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- a) Uniform and strong
- b) Non-uniform
- c) Radial
- d) Zero at the center

Answer: a)

27. An electromagnet is made stronger by:

a) Decreasing the number of turns of wire

b) Decreasing the current
c) Increasing the number of turns of wire
d) Using a non-ferromagnetic core
Answer: c)

28. The magnetic field due to a current-carrying wire is strongest:

- a) At the wire
- b) At a point far away from the wire
- c) At a point close to the wire
- d) At the center of the wire

Answer: a)

29. A galvanometer can be converted into an ammeter by:

- a) Adding a series resistance
- b) Adding a parallel resistance
- c) Increasing the number of turns in the coil
- d) None of the above
- Answer: b)

30. The magnetic field strength is highest near a:

- a) Solenoid
- b) Straight wire
- c) Loop of current
- d) Magnetic dipole

Answer: a)

31. The direction of the induced current in a closed loop due to a changing magnetic field is given by:

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- a) Faraday's law
- b) Lenz's law
- c) Ampere's law
- d) Gauss's law
- Answer: b)

32. Which of the following is a device that uses electromagnetic induction?

- a) Transformer
- b) Electric motor
- c) Galvanometer
- d) Voltmeter
- Answer: a)

33. In an electric motor, the force on the coil is caused by the interaction between:

- a) Electric and magnetic fields
- b) Two electric fields
- c) Two magnetic fields
- d) Electric and gravitational fields

Answer: a)

34. In a moving coil galvanometer, the coil is suspended in a magnetic field to detect:

- a) Electric current
- b) Voltage
- c) Resistance
- d) Power
- Answer: a)

35. The power in an electric circuit can be increased by:

- a) Increasing the current
- b) Increasing the voltage
- c) Both a and b
- d) Decreasing the resistance

Answer: c)

36. The magnetic field of a solenoid is similar to the field of a:

- a) Bar magnet
- b) Electric dipole
- c) Charged conductor
- d) Current-carrying wire
- Answer: a)

37. In electromagnetic induction, the induced EMF is proportional to:

- a) The rate of change of magnetic flux
- b) The rate of current
- c) The strength of the magnetic field
- d) The length of the conductor

Answer: a)