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Magnetism & Electromagnetsim

Chapter No.14 (MCQs)

1. An isolated stationary point charge produces around it.

a) An electric field only.
b) A magnetic field only.
c) Electric as well magnetic fields.

2. An isolated moving point charge produces around it.

a) An electric field only.
b) A magnetic field only.
c) Electric as well magnetic fields.

3. Force on a point charge +q moving with a velocity $\underset{v}{\rightarrow}$ across a magnetic field $\underset{B}{\rightarrow}$ is given by:

a) $\underset{F}{\rightarrow} = q\,(\underset{v}{\rightarrow} \times \underset{B}{\rightarrow})$
b) $\underset{F}{\rightarrow} = q\,(\underset{B}{\rightarrow} \times \underset{v}{\rightarrow})$
c) $\underset{F}{\rightarrow} = q\,(v.\underset{B}{\rightarrow})$
d) $\underset{F}{\rightarrow} = q\,(\underset{B}{\rightarrow} . \underset{v}{\rightarrow})$

4. A conductor carrying current I in a magnetic field $\underset{B}{\rightarrow}$ experience a force $\underset{F}{\rightarrow}$ given by:

a) $\underset{F}{\rightarrow} = 1\,(\underset{B}{\rightarrow} \times \underset{L}{\rightarrow})$
b) $\underset{F}{\rightarrow} = 1\,(\underset{L}{\rightarrow} \times \underset{B}{\rightarrow})$
c) $\underset{F}{\rightarrow} = 1 \times (\underset{L}{\rightarrow} \times \underset{B}{\rightarrow})$
d) $\underset{F}{\rightarrow} = 1\,(\underset{L}{\rightarrow} . \underset{B}{\rightarrow})$

5. If an α- particle is moving parallel to a magnetic field, then:

a) If experiences a force parallel to magnetic field.
b) It experiences a force perpendicular to magnetic field.
c) It experiences a force parallel to its direction of motion.
d) It will not experience any force at all.

6. Force on a point charge –q moving with a velocity V across a magnetic field B given by:

a) $\underset{F}{\rightarrow} = q\,(\underset{v}{\rightarrow} \times \underset{B}{\rightarrow})$
b) $\underset{F}{\rightarrow} = q\,(\underset{B}{\rightarrow} \times \underset{v}{\rightarrow})$
c) $\underset{F}{\rightarrow} = -q\,(\underset{B}{\rightarrow} \times \underset{v}{\rightarrow})$
d) $\underset{F}{\rightarrow} = q\,(\underset{v}{\rightarrow} . \underset{B}{\rightarrow})$

7. When an electron moves in a magnetic field $\underset{B}{\rightarrow}$ with velocity $\underset{v}{\rightarrow}$, it experiences a force perpendicular to:

a) $\underset{B}{\rightarrow}$But not perpendicular to v.
b) V but not perpendicular to $\underset{B}{\rightarrow}$
c) Both v and$\underset{B}{\rightarrow}$.
d) Parallel to $\underset{B}{\rightarrow}$

8. The magnitude of force experienced by a charged particle moving across a magnetic field is maximum when the angle at which it enters the field is:

a) 0^o
b) 60^o
c) 90^o
d) 120^o

9. Torque experienced by a current carrying coil of N turns in a magnetic field B when plane of the coil makes an angle α with the direction of B, is given by:

a) τ = B I L A Cos α
b) τ = B A N A Cos α
c) τ = B N A Cos α
d) τ = B I N A Cos α

10. When a charged particle is projected perpendicular to a magnetic field it experiences maximum force of magnitude F = q v B, under the influence of this force the particle moves along a circular path, because:

a) This force is perpendicular to velocity $\underset{v}{\rightarrow}$ and increases with the magnitude of velocity.
b) This force is perpendicular to velocity $\underset{v}{\rightarrow}$ and decreases with the magnitude of velocity.
c) This force is perpendicular to velocity $\underset{v}{\rightarrow}$ and increases its K.E.
d) This force is perpendicular to velocity $\underset{v}{\rightarrow}$ and changes its direction of motion only.

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11. For the first time e/m of an electron was determined by:

a) Faraday.
b) Rutherford.
c) Robert Millikan.
d) J.J. Thomson.

12. The S.I unit of magnetic field of induction $\underset{B}{\rightarrow}$ is:

a) Weber.
b) Weber/m^2 or Tesla.
c) Weber/amp-m.
d) Weber/amp.

13. The magnetic field produced inside a long current carrying solenoid is:

a) Strong and uniform.
b) Strong and non-uniform.
c) Weak and uniform.
d) Weak and non-uniform.

14. The magnetic field produced inside a current carrying narrow torrid is:

a) Uniform.
b) Totally non-uniform.
c) Strong near the inner wall and weak near the outer wall.
d) Weak near the inner wall and strong near the outer wall.

15. Magnetic field inside a long current carrying solenoid depends on:

a) Strength of current.
b) Number turns per unit length.
c) Permeability of the core material.
d) All of them.

16. When a conductor is subjected to a changing magnetic flux, an emf is induced in it. Current caused by this emf is called:

a) Direct current.
b) Conventional current.
c) Alternating current.
d) Induced current.

17. The unit of inductance is:

a) Ohm.
b) Weber.
c) Farad.
d) Henry.

18. An alternating current generator is electro – mechanical device. It converts.

a) Mechanical energy into electrical energy.
b) Electrical energy into mechanical energy.
c) Heat energy into electrical energy.
d) Solar energy into electrical energy.

19. A transformer transforms:

a) Voltage.
b) Current.
c) Frequency.
d) Voltage and current.

Q.No.20 In an ideal transformer:

a) The windings have no resistance.
b) Core has infinite permeability.
c) Core has no losses.
d) All of these.

21. A step up transformer increases:

a) Current.
b) Voltage.
c) Power.
d) Frequency.

22. in a Step up transformer:

a) Secondary voltage is greater than the primary voltage.
b) Secondary turns are more than the primary turns.
c) Secondary current is less than the primary current.
d) All of these.

23. A transformer having 1000 primary turns is connected to a 220-volt a.c supply. For a secondary voltage of 400 volt, the number of secondary turns should be:

a) 250 turns.
b) 400 turns.
c) 1250 turns.
d) 1600 turns.

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24. The electric motor is an electrical device, it converts:

a) Mechanical energy into electrical energy.
b) Electrical energy into mechanical energy.
c) Heat energy into electrical energy.
d) Solar energy into electrical energy.

25. Two parallel beams of fast moving electrons in free space:

a) Attract each other.
b) Repel each other.
c) Neither attracts nor repels each other.

26. Two beams of particles of different masses moving with equal velocity and carrying equal charge are projected perpendicularly to a uniform magnetic field, both particles follow a circular path, such that:

a) Lighter particle moves along a larger circle.
b) Heavier particle moves along a larger circle.
c) Both the particles move along a circular path of equal radius.

27. Two parallel conductors carrying current in the same direction:

a) Attract each other.
b) Repel each other.
c) Neither attracts nor repels each other.

28. Two parallel conductors carrying current in the opposite direction:

a) Attract each other.
b) Repel each other.
c) Neither attracts nor repels each other.

29. Maximum emf is induced in a straight conductor when it is moved:

a) Parallel to magnetic field and its length.
b) Perpendicular to magnetic field but parallel to its length.
c) Perpendicular to its length as well as magnetic field.
d) Perpendicular to its length but parallel to the magnetic field.

30. Magnetic field inside a long solenoid having "n" turns/length and carrying a current "I" is given by:

a) $B = \mu_o n I/4 \Pi r$.
b) $B = \mu_o n I/2 \Pi r$.
c) $B = \mu_o n I$.
d) $B = 2 \Pi \mu_o n I$.

31. In a magnetic field the charges at rest experience:

a) Maximum force.
b) Minimum force.
c) Attractive force.
d) Zero force.

32. Lenz's law of electromagnetic induction is in accordance with:

a) Law of conservation of charge.
b) Law of conservation of mass
c) Law of conservation of momentum.
d) Law of conservation of energy.

33. Tesla or weber.s^2 is the unit of:

a) Magnetic flux.
b) Magnetic flux density.
c) Magnetic force.
d) Torque in magnetic field.

34. Energy dissipated mainly as heat when the current flows through primary and secondary coils of a transformer results in a power loss. This loss in power is called:

a) Copper loss.
b) Iron loss.
c) Power deficit.
d) Power defect.

35. The value of permeability of free space μ_o is:

a) $4 \Pi \times 10^{-19}$ webs. /amp-m.
b) $2 \Pi \times 10^{-19}$ webs. /amp –m.
c) $2 \Pi \times 10^{-7}$ webs. /amp-m.
d) $4 \Pi \times 10^{-7}$ webs. /amp-m.

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36. Energy dissipated due to eddy current and hysteresis etc. of the core of transformer results in a power loss. This loss in power is called:
   a) Copper loss.
   b) Iron loss.
   c) Power defect.
   d) Power defect.

37. Magnetic field inside a narrow torrid of radius "r" having "N" turns and carrying a current "1" is given by:
   a) $B = \mu_o N$ ¼ Л r.
   b) $B = \mu_o N$ ½ Л r.
   c) $B = \mu_o N$ 1.
   d) $B = 2$ Л $\mu_o N1$.

38. An electron and a proton with the same momentum enter perpendicularly into a uniform magnetic field: (5-a, 1996)
   a) Both particles will deflect equally.
   b) The proton will deflect more than the electron.
   c) The electron will deflect more than the proton.

39. The maximum magnetic force will act on a current carrying conductor in a magnetic field when it is placed: (5-a, 2001)
   a) At 60^o to the field.
   b) Parallel to the field.
   c) Perpendicular to the field.
   d) At an angle of 45^o to the field.

40. The current produced by moving the loop of a wire across the magnetic field is called: (5-a, 2001)
   a) Electric current.
   b) A.C current.
   c) D.C current.
   d) Induced current.

41. The force experienced by a current – carrying conductor when it is placed in a magnetic field is: (5-a, 2001)
   a) $\underset{F}{\rightarrow} = I (\underset{v}{\rightarrow} x \underset{B}{\rightarrow})$.
   b) $\underset{F}{\rightarrow} = I (\underset{L}{\rightarrow} x \underset{B}{\rightarrow}.)$
   c) $\underset{F}{\rightarrow} = \underset{B}{\rightarrow} (I x \underset{L}{\rightarrow})$.
   d) None of the above.

42. The phenomenon of producing e.m.f in a coil due to the change of current in the coil itself is called: (6-a, 2001)
   a) Mutual induction.
   b) Self induction.
   c) Magnetic flux.
   d) None of the above.

43. A steady current passing through a conductor produces: (3-a, 2002, P.M)
   a) An electric field only.
   b) A magnetic field only.
   c) Both electric and magnetic fields.
   d) Neither electric nor magnetic field.

44. If a straight conductor of length "L" carrying a current "I" is placed parallel to a magnetic field "B" the force experienced by the conductor is: (5-a, 2002, P.M)
   a) B I L.
   b) B I L Sinθ.
   c) Zero.
   d) Infinite.

45. When a charged particle enters a uniform magnetic field perpendicularly, its path is: (5-a, 2002, P.E)
   a) Spiral.
   b) Circular.
   c) Parabolic.
   d) Straight line.

46. If an electron and a proton enter a magnetic field perpendicularly with the same momentum: (3-a, 2002, P.M)
   a) The electron will be deflected more.
   b) The proton will be deflected more.
   c) Both the particles will be deflected equally.
   d) They will not be deflected at all.

47. Transformer works on: (4-a, 2002, P.E)
   a) Ohm's law.
   b) Self induction.
   c) Mutual induction.
   d) Gauss's law.

48. The deflecting torque on a current carrying coil placed in a magnetic field is maximum when the angle between the magnetic field and the plane of the coil is: (4-a, 2002, P.E)
   a) Zero.
   b) 90^o.
   c) 60^o.
   d) 45^o.

49. One Tesla is equal to: (4-a, 2003 PM)
   a) 1 Weber/meter^2.
   b) 2 Weber/meter.
   c) Weber^2/meter^2
   d) Newton /ampere.

50. When the north pole of a bar magnet approaches the face of a closed coil the face becomes: (6-a, 2003 PM)
   a) South Pole.
   b) First north and then South Pole.
   c) North Pole.
   d) No effect is observed.

51. In step –down transformer: (6-a, 2003 PM)
   a) Ns > Np.
   b) Ns = Np.
   c) Ns = Np.
   d) Ns = Np

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52. Tesla (T), the unit of B, is: (6-and I, 2004)
    a) $\frac{\text{Newton}}{\text{Coulomb x meter}}$
    b) $\frac{\text{Newton}}{\text{Ampere x meter}}$
    c) $\frac{\text{Ampere}}{\text{Newton x meter}}$
    d) $\frac{\text{Ampere x meter}}{\text{Newton}}$
53. The direction of induced current is given by: (3-a iii, 2005)
    a) Ampere's law.
    b) Faraday's law.
    c) Lenz's law.
    d) Snell's law.
54. The maximum resistance in an A.C circuit is offered by: (4-a ii, 05)
    a) Capacitor.
    b) Solenoid.
    c) Electromagnet.
    d) Electric bulb.
55. The path of a neutron moving normal to a magnetic field is a/an:
    a) Straight line.
    b) Oval (4-a ii, 05)
    c) Circular.
    d) Sinusoidal.
56. S.I unit of induction is: (5-a I, 05)
    a) Tesla.
    b) Henry.
    c) Watt.
    d) Weber.
57. The force per unit length of a current carrying conductor in a uniform magnetic field is given by: (5-an iii, 05)
    a) IBL Sinθ.
    b) IBL Cosθ.
    c) IB Sinθ.
    d) IB Cosθ.
58. The motional emf induced in a coil is independent of: (1-iii, 10)
    a) Change of flux.
    b) Number of turns.
    c) Time.
    d) Resistance.
59. Transformer is used in a circuits containing: (1-iv, 10)
    a) D c alone.
    b) A.c alone.
    c) Both a.c and d.c.
    d) Non-inductive winding.

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ANSWERS

1. **An electric** field only.
2. Electric as well magnetic fields.
3. $\underset{F}{\rightarrow} = q\ (\underset{X}{\rightarrow}\ \underset{B}{\rightarrow})$
4. $\underset{F}{\rightarrow} = 1\ (\underset{V}{\rightarrow} \times \underset{B}{\rightarrow})$
5. It will <u>not experience any force</u> at all.
6. $\underset{F}{\rightarrow} = q\ (\underset{B}{\rightarrow} \times V)$
7. Both v and $\underset{B}{\rightarrow}$.
8. 90^{o}

   τ = BINA Cos α
9. This force is <u>perpendicular</u> to velocity $\underset{V}{\rightarrow}$ and changes its direction of motion only.
10. J.J. Thomson.
11. Weber/m^2 or Tesla.
12. **Strong and** uniform.
13. <u>Strong</u> near the inner wall and w<u>eak</u> near the outer wall.
14. All of them.
15. Induced current.
16. Henry.
17. <u>Mechanical</u> energy into <u>electrical</u> energy.
18. Voltage and current.
19. All of these.
20. Voltage.
21. All of these.
22. 1600 turns.
23. <u>Electrical</u> energy into <u>mechanical</u> energy.
24. Attract each other.
25. <u>Heavier</u> particle moves along a <u>larger</u> circle.
26. Attract each other.
27. Repel each other.
28. <u>Perpendicular</u> to its length as well as magnetic field.
29. B = μ_o n I.
30. Zero force.
31. Law of conservation of <u>energy</u>.
32. Magnetic flux density.
33. **Copper loss.**
34. Л x 10^{-7} webs. Amp- m.
35. Iron loss.
36. B = μ_o N I/2 Л r.
37. The electron will deflect more than the proton.
38. Perpendicular to the field.
39. Induced current.
40. $\underset{F}{\rightarrow} = I\ (\underset{L}{\rightarrow} \times \underset{B}{\rightarrow})$.
41. Self induction.
42. A magnetic field only.
43. Zero.
44. Circular.
45. The electron will be deflected more.
46. Mutual induction.
46. **Zero.**
47. **1 Weber/**meter^2.
48. South Pole.
49. Ns < Np.
50. $\frac{\text{Newton}}{\text{Ampere x meter.}}$
51. Lenz's law
52. Capacitor.
53. Straight line.
54. Henry.
55. IB Sinθ.
56. Resistance.
57. A.c. alone.

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