UNIT 18 MAGNETIC FIELDS

MULTIPLE CHOICE QUESTIONS (BOOK XII)

1. If we reverse the direction of the electric current, then the direction of the magnetic field will be:

   (a) Same
   (b) Reversed
   (c) tangent
   (d) normal

2. The application of the magnetic field is:

   (a) microwave oven
   (b) Magnetic levitation trains
   (c) electrolysis
   (d) plant photosynthesis

3. The equation F=BIL can only be used if the magnetic field, length of conductor, and electric current are:

   (a) At right angles to each other
   (c) Anti-parallel to each other
   (b) in the same direction
   (d) anti-perpendicular to each other

4. If the charge on a particle is doubled, and its velocity remains the same, how then the magnetic force on the particle will be:

   (a) doubled
   (b) halved
   (c) Is the same.
   (d) quadrupled

5. The strength of the magnetic field of the solenoid can be increased by:

   (a) Increasing number of turns
   (b) Decrease the number of turns
   (c) increasing the current through the solenoid
   (d) inserting a ferromagnetic core (e.g., iron) into the solenoid

6. The magnetic field inside a solenoid is:

   (a) equal to zero
   (b) uniform
   (c) decreases as we go away from the center to the surface
   (d) increases as we go towards the surface

7. The force between two current-carrying conductors arises due to

   (a) Magnetic effect of current
   (b) Polarization
   (c) Electromagnetic induction
   (d) Electrostatic interaction

8. To measure a higher voltage, what should you do with the voltmeter's internal resistance?

(a) Increase it **(b) Decrease it**

(c) Keep it the same (d) It doesn't affect the measurement

9. A proton moves perpendicular to a uniform magnetic field. What is the direction of the force experienced by the proton?

(a) Parallel to the magnetic field (b) In the direction of the proton's velocity

(c) Perpendicular to the magnetic field and the proton's velocity

(d) Opposite to the direction of the proton's velocity

10. An electron moves parallel to a uniform magnetic field. What is the magnitude of the force experienced by the electron?

(a) Maximum, since the electron is moving in the same direction as the field

(b) Minimum, since the electron is moving perpendicular to the field

(c) Zero, since the electron is moving parallel to the field

(d) It depends on the speed of the electron

EXAMS PRACTICE MULTIPLE CHOICE QUESTIONS

1 When a charged particle moves in a magnetic field its kinetic energy _____ .

(a) remains constant (b) can increase

(c) can decrease (d) can increase or decrease

2 An electron moving with a velocity of 15 ms-1 enters a uniform magnetic field of 0.2 T, along a direction parallel to the field. What would be its trajectory in this field?

(a) Elliptical **(b) Straight path**

(c) Helical (d) Circular

3 Which of the following will experience a maximum force, when projected with the same velocity perpendicular to the magnetic field : (i) α-particle, and (ii) β-particle?

(a) Both α-particle and β-particle (b) zero force

(c) β-particle **(d) α-particle**

4 A proton enters a magnetic field of flux density 5 T with a velocity of 5×10^7 ms^{-1} at an angle of 90^0 with the field. Find the force on the proton.

(a) 0.2×10^{-11} N (b) 2×10^{-11} N

(c) 4×10^{-11} N (d) 200×10^{-11} N

5 When a charged particle enters a magnetic field with velocity perpendicular to the direction of the magnetic field. The particle follows a curved path. What will happen to the radius of this curved path if the magnetic field is increased?

(a) particle goes in a straight line. (b) radius will remain the same

(c) radius will increase **(d) radius will decrease**

6 Which of the following particles will not experience any magnetic force in a magnetic field?
(a) A proton moving in a magnetic field
(b) An electron moving in a magnetic field
(c) An alpha particle moving in a magnetic field
(d) A neutron moving in a magnetic field

7 The charged particle enters the uniform magnetic field in such a way that its initial velocity is not perpendicular to the field the orbit will be_____?
(a) a circle (b) a spiral
(c) an ellipse **(d) helix**

8 A Current carrying wire is placed in a magnetic field where the magnetic field is perpendicular to the plane of the conductor. What will happen to the force applied to the conductor if the current in the wire is doubled?
(a) Doubled (b) Halved
(c) Become three times (d) Remains same

9 The strength of the magnetic field around a current-carrying wire.
(a) increases as the distance from the wire increases.
(b) is greater near the wire.
(c) is independent of distance from the wire
(d) is independent of the current in a wire

10 The magnitude of the force acting on a current-carrying conductor placed in the magnetic field is independent of
(a) flux density (b) length of conductor
(c) cross-sectional area of conductor (d) current flowing through the conductor

11 A 200 mm long conductor carries a current of 20 A and is situated at right angles to a magnetic field having a flux density of 0.9 T. The force on the conductor will be
(a) 36 N (b) 1.8 N
(c) 3.6 N (d) 18 N

12 A conductor of length L has current I passing through it, when it is placed parallel to a magnetic field of density B. The force experienced by the conductor will be
(a) Zero (b) BIL
(c) BILsinθ (d) 2BI L

13 Tesla is a unit of
(a) Field strength (b) Inductance
(c) Flux density (d) Flux

14 Which of the following is a vector quantity?
(a) Relative permeability **(b) Magnetic field intensity**
(c) electric potential (d) Magnetic potential

15 Which of the following is not a unit of flux?
(a) Maxwell **(b) Telsa**
(c) Weber (d) All of the above

16 One telsa is equal to
(a) 1 Wb/mm^2 (b) 1 Wb/m
(c) 1 Wb/m^2 (d) 1 mWb/m^2

17 One maxwell is equal to
(a) 10×10^{-8} Wb (b) 10×10^{8} Wb
(c) 1 Wb (d) 10 Wb

18 The commonly used material for shielding or screening magnetism is
(a) Copper (b) Aluminum
(c) Soft iron (d) Brass

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19 Which type of physical quantity is magnetic flux?

(a) Scalar (b) Vector

(c) Isotropic (d) Isentropic

20 The magnetic field at a point P situated at a perpendicular distance 'R' from a long straight wire carrying a current of 12 A is 3×10^{-5} Wb/m^2. The value of 'R' is:

[$\mu_0 = 4\pi \times 10^{-7}$ Wb/A m]

(a) 0.08mm (d) 0.8mm

(c) 8mm **(d) 80mm**

21 The magnetic field intensity at a distance r from a long wire carrying current I is 0.4 tesla. The magnetic field intensity at a distance of 2r is

(a) 0.2 tesla (b) 0.8 tesla

(c) 0.1 tesla (d) 1.6 tesla

22 The ampere circuital law is used to find

(a) Magnetic field (b) Electric field

(c) Force (d) Velocity

23 What will be the magnetic field due to a straight current-carrying copper wire of magnitude 1 A at a minimum distance of 2 meter: ($\mu_0 = 4\pi \times 10^{-7}$ Wb/A-m)

(a) 2×10^{-7} Wb (b) 1×10^{-6} Wb

(c) 2×10^{-6} Wb **(d) 1×10^{-7} Wb**

24 Calculate the magnetic field intensity due to a toroid of turns 50, current 2A, and radius 159mm.

(a) 50 (b) 75

(c) 100 (d) 200

25 1 gauss is equal to

(a) 10^4 T **(b) 10^{-4} T**

(c) 10^3 T (d) 10^{-3} T

26 The charge-to-mass ratio of an electron is

(a) 5.69×10^{-12} C/kg **(b) 1.76×10^{11} C/kg**

(c) 1.76×10^{-11} C/kg (d) 5.69×10^{12} C/kg

27 A moving coil galvanometer is converted into an ammeter by connecting to it:

(a) low resistance in series (b) high resistance in series

(c) high resistance in parallel **(d) low resistance in parallel**

28 A galvanometer can be converted into a voltmeter by connecting:

(a) Low resistance in series **(b) High resistance in series**

(c) Low resistance in parallel (d) High resistance in parallel

29 Magnetic field inside a solenoid is

(a) zero (b) weak

(c) uniform (d) non-uniform

30 Solenoid of length 15 cm has 300 turns. If the current flowing through the solenoid is 5 A, the magnetic field inside the solenoid will be

(c) 2.3×10^2 **(c) 1.3×10^2**

(c) 1.1×10^2 (c) 1.4×10^2