NEET : CHAPTER WISE TEST-4

SUBJECT :- PHYSICS | **DATE..**
CLASS :- 12th | **NAME..**
CHAPTER :- MAGNETIC EFFECT OF CURRENT | **SECTION..**

(SECTION-A)

1. The magnetic field of a given length of wire carrying a current for a single turn circular coil at centre is B, then its value for two turns for the same wire when same current passing through it is :-

(A) $\frac{B}{4}$ (B) $\frac{B}{2}$ (C) 2B (D) 4B

2. Field at the centre of a circular coil of radius *r*, through which a current *I* flows is

(A) Directly proportional to *r*
(B) Inversely proportional to *I*
(C) Directly proportional to *I*
(D) Directly proportional to I^2

3. The magnetic field inside a long solenoid is -

(A) infinite (B) zero
(C) uniform (D) non-uniform

4. The magnetic moment of a current carrying loop is $2.1 \times 10^{-25}\ amp \times m^2$. The magnetic field at a point on its axis at a distance of $1\ \mathring{A}$ is

(A) $4.2 \times 10^{-2}\ weber\ / m^2$
(B) $4.2 \times 10^{-3}\ weber\ / m^2$
(C) $4.2 \times 10^{-4}\ weber\ / m^2$
(D) $4.2 \times 10^{-5}\ weber\ / m^2$

5. A long copper tube of inner radius *R* carries a current *i*. The magnetic field *B* inside the tube is

(A) $\frac{\mu_0 i}{2\pi R}$ (B) $\frac{\mu_0 i}{4\pi R}$
(C) $\frac{\mu_0 i}{2R}$ (D) Zero

6. The magnetic induction at any point due to a long straight wire carrying a current is

(A) Proportional to the distance from the wire
(B) Inversely proportional to the distance from wire
(C) Inversely proportional to the square of the distance from the wire
(D) Does not depend on distance

7. The earth's magnetic induction at a certain point is $7 \times 10^{-5} Wb / m^2$. This is to be annulled by the magnetic induction at the centre of a circular conducting loop of radius 5 *cm*. The required current in the loop is

(A) 0.56 *A* (B) 5.6 *A*
(C) 0.28 *A* (D) 2.8 *A*

8. Magnetic field intensity at the centre of coil of 50 turns, radius 0.5 *m* and carrying a current of 2 *A* is

(A) $0.5 \times 10^{-5}\ T$ (B) $1.25 \times 10^{-4}\ T$
(C) $3 \times 10^{-5}\ T$ (D) $4 \times 10^{-5}\ T$

9. A charge of 1C is moving in a perpendicular magnetic field of 0.5 Tesla with a velocity of 10 m/sec. Force experienced is:

(A) 5 N (B) 10 N
(C) 0.5 N (D) 0 N

10. A straight wire of diameter 0.5 *mm* carrying a current of 1 *A* is replaced by another wire of 1 *mm* diameter carrying the same current. The strength of magnetic field far away is

(A) Twice the earlier value
(B) Half of the earlier value
(C) Quarter of its earlier value
(D) Unchanged

11. Current I is flowing in a conducting circular loop of radius R. It is kept in a uniform magnetic field B. Find the magnetic force acting on the loop.

(A) IRB (B) 2πIRB
(C) Zero (D) πIRB

12. The magnetic field at the centre of semi-circular wire carrying current i is

(A) $\frac{\mu_0 i}{2r}$ (B) $\frac{\mu_0 i}{4r}$
(C) $\frac{\mu_0 i}{r}$ (D) $\frac{\mu_0 i}{2\pi r}$

13. A long solenoid carrying a current produces a magnetic field B along its axis. If the current is doubled and the number of turns per *cm* is halved, the new value of the magnetic field is

(A) *B* (B) 2 *B*
(C) 4 *B* (D) *B/2*

14. The field due to a long straight wire carrying a current *I* is proportional to

(A) *I* (B) I^3

(C) $\sqrt{I}$ (D) $1/I$

15. A uniform electric field and a uniform magnetic field are produced, pointed in the same direction. An electron is projected with its velocity pointing in the same direction

(A) The electron will turn to its right

(B) The electron will turn to its left

(C) The electron velocity will increase in magnitude

(D) The electron velocity will decrease in magnitude

16. Particles having positive charges occasionally come with high velocity from the sky towards the earth. On account of the magnetic field of earth, they would be deflected towards the

(A) North (B) South

(C) East (D) West

17. An $\alpha-$particle travels in a circular path of radius 0.45 *m* in a magnetic field $B=1.2\,Wb/m^2$ with a speed of $2.6\times10^7\,m/\sec$. The period of revolution of the $\alpha-$particle is

(A) 1.1×10^{-5} sec (B) 1.1×10^{-6} sec

(C) 1.1×10^{-7} sec (D) 1.1×10^{-8} sec

18. A uniform magnetic field acts at right angles to the direction of motion of electrons. As a result, the electron moves in a circular path of radius 2 *cm*. If the speed of the electrons is doubled, then the radius of the circular path will be

(A) 2.0 *cm* (B) 0.5 *cm*

(C) 4.0 *cm* (D) 1.0 *cm*

19. A magnetic field

(A) Always exerts a force on a charged particle

(B) Never exerts a force on a charged particle

(C) Exerts a force, if the charged particle is moving across the magnetic field lines

(D) Exerts a force, if the charged particle is moving along the magnetic field lines

20. An electron enters a region where magnetic (2) and electric (*E*) fields are mutually perpendicular to one another, then

(A) It will always move in the direction of *B*

(B) It will always move in the direction of *E*

(C) It always possess circular motion

(D) It can go undeflected also

21. If an electron is going in the direction of magnetic field $\vec{B}$ with the velocity of $\vec{v}$ then the force on electron is

(A) Zero (B) $e(\vec{v}\cdot\vec{B})$

(C) $e(\vec{v}\times\vec{B})$ (D) None of these

22. In a cyclotron, the angular frequency of a charged particle is independent of

(A) Mass (B) Speed

(C) Charge (D) Magnetic field

23. An α particle and a proton travel with same velocity in a magnetic field perpendicular to the direction of their velocities, find the ratio of the radii of their circular path

(A) 4 : 1 (B) 1 : 4

(C) 2 : 1 (D) 1 : 2

24. Two free parallel wires carrying currents in opposite direction

(A) Attract each other

(B) Repel each other

(C) Neither attract nor repel

(D) Get rotated to be perpendicular to each other

25. An electron and proton enter a magnetic field perpendicularly. Both have same kinetic energy. Which of the following is true ?

(A) Trajectory of electron is less curved

(B) Trajectory of proton is less curved

(C) Both trajectories are equally curved

(D) Both move on straight line path

26. Two parallel wires are carrying electric currents of equal magnitude and in the same direction. They exert

(A) An attractive force on each other

(B) A repulsive force on each other

(C) No force on each other

(D) A rotational torque on each other

27. Two long and parallel wires are at a distance of 0.1 *m* and a current of 5 *A* is flowing in each of these wires. The force per unit length due to these wires will be

(A) $5\times10^{-5}\ N/m$ (B) $5\times10^{-3}\ N/m$

(C) $2.5\times10^{-5}\ N/m$ (D) $2.5\times10^{-4}\ N/m$

28. The radius of a circular loop is *r* and a current *i* is flowing in it. The equivalent magnetic moment will be

(A) *ir* (B) $2\pi ir$

(C) $i\pi r^2$ (D) $\frac{1}{r^2}$

29. A coil carrying electric current is placed in uniform magnetic field, then

(A) Torque is formed

(B) E.M.f. is induced

(C) Both (A) and (B) are correct

(D) None of these

30. Two parallel wires in free space are 10 *cm* apart and each carries a current of 10 *A* in the same direction. The force one wire exerts on the other per metre of length is

(A) $2\times10^{-4}\ N$, attractive

(B) $2\times10^{-4}\ N$, repulsive

(C) $2\times10^{-7}\ N$, attractive

(D) $2\times10^{-7}\ N$, repulsive

31. If *m* is magnetic moment and *B* is the magnetic field, then the torque is given by

(A) $\vec{m}.\vec{B}$ (B) $\frac{|\vec{m}|}{|\vec{B}|}$

(C) $\vec{m}\times\vec{B}$ (D) $|\vec{m}|.|\vec{B}|$

32. Which is a vector quantity

(A) Density

(B) Magnetic flux

(C) Intensity of magnetic field

(D) Magnetic potential

33. Magnetic lines of force

(A) Always intersect

(B) Are always closed

(C) Tend to crowd far away from the poles of magnet

(D) Do not pass through vacuum

34. The work done in turning a magnet of magnetic moment '*M*' by an angle of 90° from the meridian is '*n*' times the corresponding work done to turn it through an angle of 60°, where '*n*' is given by

(A) 1/2 (B) 2 (C) 1/4 (D) 1

35. A permanent magnet

(A) Attracts all substances

(B) Attracts only magnetic substances

(C) Attracts magnetic substances and repels all non-magnetic substances

(D) Attracts non-magnetic substances and repels magnetic substances

(SECTION-B)

36. A magnet of magnetic moment $50\,\hat{i}\ A\text{-}m^2$ is placed along the *x*-axis in a magnetic field $\vec{B}=(0.5\,\hat{i}+3.0\,\hat{j})T$. The torque acting on the magnet is

(A) 175 $\hat{k}\ N\text{-}m$ (B) 150 $\hat{k}\ N\text{-}m$

(C) 75 $\hat{k}\ N\text{-}m$ (D) $25\sqrt{37}\ \hat{k}\ N\text{-}m$

37. Two lines of force due to a bar magnet

(A) Intersect at the neutral point

(B) Intersect near the poles of the magnet

(C) Intersect on the equatorial axis of the magnet

(D) Do not intersect at all

38. The torque on a bar magnet due to the earth's magnetic field is maximum when the axis of the magnet is

(A) Perpendicular to the field of the earth

(B) Parallel to the vertical component of the earth's field

(C) At an angle of 33° with respect to the *N-S* direction

(D) Along the North-South (*N-S*) direction

39. A closely wound solenoid of 2000 turns and area of cross-section $1.5\times10^{-4}\ m^2$ carries a current of 2.0 A. It is suspended through its centre and perpendicular to its length, allowing it to turn in a horizontal plane in a uniform magnetic field 5×10^{-2} tesla making an angle of 30° with the axis of the solenoid. The torque on the solenoid will be

(A) 3×10^{-3} N m (B) 1.5×10^{-3} N m

(C) 1.5×10^{-2} N m (D) 3×10^{-2} N m

40. If the angles of dip at two places are 30° and 45° respectively, then the ratio of horizontal components of earth's magnetic field at the two places will be

(A) $\sqrt{3}:\sqrt{2}$ (B) $1:\sqrt{2}$

(C) $1:\sqrt{3}$ (D) $1:2$

41. The angle of dip is the angle
(A) Between the vertical component of earth's magnetic field and magnetic meridian
(B) Between the vertical component of earth's magnetic field and geographical meridian
(C) Between the earth's magnetic field direction and horizontal direction
(D) Between the magnetic meridian and the geographical meridian

42. At a certain place the angle of dip is 30° and the horizontal component of earth's magnetic field is 0.50 *Oersted*. The earth's total magnetic field is
(A) $\sqrt{3}$ (B) 1
(C) $\frac{1}{\sqrt{3}}$ (D) $\frac{1}{2}$

43. At a certain place, the horizontal component B_0 and the vertical component V_0 of the earth's magnetic field are equal in magnitude. The total intensity at the place will be
(A) B_0 (B) B_0^2
(C) $2B_0$ (D) $\sqrt{2}B_0$

44. Which of the following relation is correct in magnetism
(A) $I^2 = V^2 + H^2$ (B) $I = V + H$
(C) $V = I^2 + H^2$ (D) $V^2 = I + H$

45. Magnetic moments of two bar magnets may be compared with the help of
(A) Deflection magnetometer
(B) Vibration magnetometer
(C) Both of the above
(D) None of the above

46. **Assertion :** The coil is bound over the metallic frame in moving coil galvanometer.
Reason : The metallic frame help in making steady deflection without any oscillation.
(A) If both assertion and reason are true and the reason is the correct explanation of the assertion.
(B) If both assertion and reason are true but reason is not the correct explanation of the assertion.
(C) If assertion is true but reason is false.
(D) If the assertion and reason both are false.

47. Time period in vibration magnetometer will be infinity at
(A) Magnetic equator
(B) Magnetic poles
(C) Equator
(D) At all places

48. Two bar magnets of the same mass, length and breadth but magnetic moments *M* and 2*M* respectively, when placed in same position, time period is 3 *sec*. What will be the time period when they are placed in different position
(A) $\sqrt{3}$ sec (B) $3\sqrt{3}$ sec
(C) 3 sec (D) 6 sec

49. A magnetic needle suspended horizontally by an unspun silk fibre, oscillates in the horizontal plane because of the restoring force originating mainly from
(A) The torsion of the silk fibre
(B) The force of gravity
(C) The horizontal component of earth's magnetic field
(D) All the above factors

50. Match the statements of column A with those of column B.

	Column A		Column B
(A)	Magnetic field induction	(P)	$A\ m^{-1}$
(B)	1 Gauss	(Q)	No unit
(C)	Intensity of magnetic field	(R)	Directly proportional to the current flowing through the wire
(D)	Magnetic susceptibility	(S)	0.0001 S.I units of magnetic induction

(A) A – Q; B – R; C – P; D – S
(B) A – S; B – R; C – Q; D – P
(C) A – P; B – Q; C – R; D – S
(D) A – R; B – S; C – P; D – Q