DPP

DAILY PRACTICE PROBLEMS

Class : XIIth **Subject : PHYSICS**
Date : **DPP No. : 1**

Topic :- MOVING CHARGES AND MAGNETISM

1. Four charged particles are projected perpendicularly into the magnetic field with equal. Which will have minimum frequency?
   a) Proton b) Electron c) Li^+ d) He^+

2. A circular coil carrying a certain current produces a magnetic field B_0 at its centre. The coil is now rewound so as to have 3 turns and the same current is passed through it. The new magnetic field at the centre is
   a) $\frac{B_0}{9}$ b) $9B_0$ c) $\frac{B_0}{3}$ d) $3B_0$

3. A proton of energy 200 MeV enters the magnetic field of 5 T. If direction of field is from south to north and motion is upward, the force acting on it will be
   a) Zero b) $1.6 \times 10^{-10} N$ c) $3.2 \times 10^{-8} N$ d) $1.6 \times 10^{-6} N$

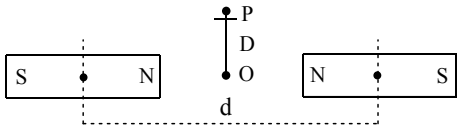
4. Magnetic fields at two points on the axis of a circular coil at a distance of 0.05 m and 0.2m from the centre are in the ratio 8:1. The radius of the coil is
   a) 1.0 m b) 0.1 m c) 0.15 m d) 0.2 m

5. A circular coil of 20 turns and radius 10 cm is placed in uniform magnetic field of 0.10 T normal to the plane of the coil. If the current in coil is 5 A, then the torque acting on the coil will be
   a) 31.4 Nm
   b) 3.14 Nm
   c) 0.314 Nm
   d) zero

6. A vertical circular coil of radius 0.1 m and having 10 turns carries a steady current. When the plane of the coil is normal to the magnetic meridian, a neutral point is observed at the centre of the coil. If $B_H = 0.314 \times 10^{-4}$ the current in the coil is
   a) 0.5 A b) 0.25 A c) 2 A d) 1 A

7. A current i flows in a circular coil of radius r. If the coil is placed in a uniform magnetic field B with its plane parallel to the field, magnitude of the torque that acts on the coil is
   a) Zero b) $2\pi riB$ c) $\pi r^2 iB$ d) $2\pi r^2 iB$

8. Two identical bar magnets are fixed with their centres at a distance d apart. A stationary charge Q is placed at P in between the gap of the two magnets at a distance D from the centre O as shown in the figure



The force on the charge Q is

a) Zero
b) Directed along OP
c) Directed along PO
d) Directed perpendicular to the plane of paper

9. The proton is energy 1 MeV describes a circular path in plane at right angles to a uniform magnetic field of 6.28×10^{-4} T. The mass of the proton is 1.7×10^{-27} kg. The cyclotron frequency of the proton is very nearly equal to

a) 10^7 Hz
b) 10^5Hz
c) 10^6 Hz
d) 10^4 Hz

10. A particle of mass m and charge q is placed at a rest in a uniform electric field E and then released. The kinetic energy attained by the particle after moving a distance y is

a) $q\,Ey^2$
b) $q\,E^2y$
c) $q\,Ey$
d) q^2Ey

11. Two particles of equal charges after being accelerated through the same potential difference enter a uniform transverse magnetic field and describe circular path of radii R_1 and R_2 respectively. Then the ratio of their masses (M_1/M_2) is

a) $\frac{R_1}{R_2}$
b) $\left(\frac{R_1}{R_2}\right)^2$
c) $\frac{R_2}{R_1}$
d) $\left(\frac{R_2}{R_1}\right)^2$

12. A 2 μC charge moving around a circle with a frequency of $6.25 \times 10^{12} Hz$ produces a magnetic field 6.28 tesla at the centre of the circle. The radius of the circle is

a) 2.25 m
b) 0.25 m
c) 13.0 m
d) 1.25 m

13. Two particles X and Y having equal charges, after being accelerated through the same potential difference, enter a region of uniform magnetic field and describes circular path of radius R_1 and R_2 respectively. The ratio of mass of X to that of Y is

a) $(R_1/R_2)^{1/2}$
b) R_2/R_1
c) $(R_1/R_2)^2$
d) R_1/R_2

14. The deflection in a moving coil galvanometer is

a) Directly proportional to the torsional constant
b) Directly proportional to the number of turns in the coil
c) Inversely proportional to the area of the coil
d) Inversely proportional to the current flowing

15. A microammeter has a resistance of 100 Ω and full scale range of 50μ A. It can be used as a voltmeter of as a higher range ammeter provided a resistance is added to it. Pick the correct range and resistance combinations

a) 50 V range with 10 k Ω resistance in series
b) 10 V range with 200 k Ω resistance in series
c) 10 mA range with 1 Ω resistance in parallel
d) 10 mA range with 0.1 Ω resistance in parallel

16. A straight section PQ of a circuit lies along the X-axis from $x = \frac{-a}{2}$ to $x = \frac{a}{2}$ and carries a steady current i. The magnetic field due to the section PQ at a distance $x = +a$ will be

a) Proportional to a
b) Proportional to $1/a$
c) Proportional to a^2
d) Zero

17. A vertical wire carrying a current in the upward direction is placed in horizontal magnetic field directed towards north. The wire will experience a force directed towards
    a) North b) South c) East d) West
18. A direct current I flows along the length of an infinitely long straight thin walled pipe, then the magnetic field is
    a) Uniform throughout the pipe but not zero
    b) Zero only along the axis of the pipe
    c) Zero at any point inside the pipe
    d) Maximum at the centre and minimum at the edge
19. A current of 1 $ampere$ is passed through a straight wire of length 2.0 $metres$. The magnetic field at a point in air at a distance of 3 $metres$ from either end of wire and lying on the axis of wire will be
    a) $\frac{\mu_0}{2\pi}$ b) $\frac{\mu_0}{4\pi}$ c) $\frac{\mu_0}{8\pi}$ d) Zero
20. When a positively charged particle enters a uniform magnetic field with uniform velocity, its trajectory can be
    (1) a straight line
    (2) a circle
    (3) a helix
    a) (1) only b) (1) or (2)
    c) (1) or (3) d) Any one of (1), (2) and (3)