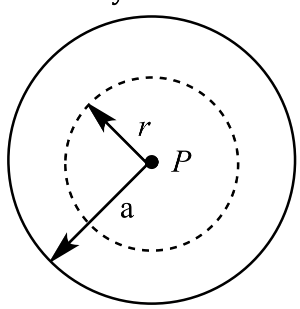
DPP

DAILY PRACTICE PROBLEMS

Class : XIIth | Subject : PHYSICS
Date : | DPP No. : 2

Topic :- MOVING CHARGES AND MAGNETISM

1. An electron is travelling along the x-direction. It encounters a magnetic field in the y-direction. Its subsequent motion will be
   a) Straight line along the x-direction
   b) A circle in the xz-plane
   c) A circle in the yz-plane
   d) A circle in the xy-plane
2. A thin disc having radius r and charge q distributed uniformly over the disc is rotated n rotations per second about its axis. The magnetic field at the centre of the disc is
   a) $\frac{\mu_0 qn}{2r}$ b) $\frac{\mu_0 qn}{r}$ c) $\frac{\mu_0 qn}{4r}$ d) $\frac{3\mu_0 qn}{4r}$
3. The figure shows the cross-section of a long cylindrical conductor of radius a carrying a uniformly distributed current i. The magnetic field due to current at P is



   a) $\mu_0 ir/(2\pi a^2)$ b) $\mu_0 ir^2/(2\pi a)$ c) $\mu_0 ia/(2\pi r^2)$ d) $\mu_0 ia^2/(\pi r^2)$
4. Force acting on a magnetic pole of 7.5×10^{-2} A-m is 1.5 N. Magnetic field at the point is
   a) 20 Wbm^{-2} b) 50 Wbm^{-2} c) 112.5 T d) 2.0 T
5. The direction of magnetic lines of forces close to a straight conductor carrying current will be
   a) Along the length of the conductor
   b) Radially outward
   c) Circular in a plane perpendicular to the conductor
   d) Helical
6. If a proton, deuteron and α-particle on being accelerated by the same potential difference enters perpendicular to the magnetic field, then the ratio of their kinetic energies is
   a) 1 :2 :2 b) 2 :2 :1 c) 1 :2 :1 d) 1 :1 :2
7. The strength of the magnetic field at a point r near a long straight current carrying wire is B. The field at a distance $\frac{r}{2}$ will be
   a) $\frac{B}{2}$ b) $\frac{B}{4}$ c) $2B$ d) $4B$

8. A charge particle of mass m and charge q enters a region of uniform magnetic field $\mathbf{B}$ perpendicular of its velocity $\mathbf{v}$. The particle initially at rest was accelerated by a potential difference V (volts) before it entered the region of magnetic field. What is the diameter of the circular path followed by the charged particle in the region of magnetic field?

a) $\frac{2}{B}\sqrt{\frac{mV}{q}}$
b) $\frac{2}{B}\sqrt{\frac{2mV}{q}}$
c) $B\sqrt{\frac{2mV}{q}}$
d) $\frac{B}{q}\sqrt{\frac{2mV}{B}}$

9. Positively charged particles are projected into a magnetic field. If the direction of the magnetic field is along the direction of motion of the charge particles, the particles get

a) Accelerated
b) Decelerated
c) Deflected
d) No changed in velocity

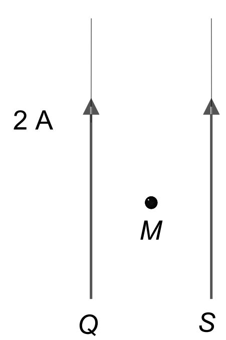
10. Toroid is

a) Ring shaped closed solenoid
b) Rectangular shaped solenoid
c) Ring shaped open solenoid
d) Square shaped solenoid

11. A long solenoid has 800 turns per metre length of solenoid. A current of 1.6 A flows through it. The magnetic induction at the end of the solenoid on its axis is

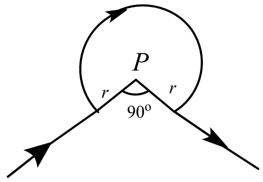
a) 16×10^{-4} T
b) 8×10^{-4} T
c) 32×10^{-4} T
d) 4×10^{-4} T

12. PQ and RS are long parallel conductors separated by certain distance. M is the mid-point between them (see the figure). The net magnetic field at M is B. Now, the current 2 A is switched off. The field at M now becomes



a) $2B$
b) B
c) $\frac{B}{2}$
d) $3B$

13. A wire shown in figure carries a current of 40 A. If $r = 3.14$ cm, the magnetic field at point P will be



a) 1.6×10^{-3} T
b) 3.2×10^{-2} T
c) 4.8×10^{-3} T
d) 6.0×10^{-4} T

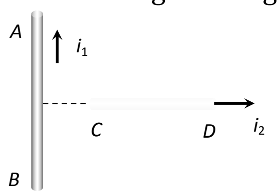
14. Two long parallel wires P and Q are both perpendicular to the plane of the paper with distance 5 m between them. If P and Q carry current of 2.5 amp and 5 amp respectively in the same direction, then the magnetic field at a point half way between the wires is

a) $\frac{\sqrt{3}\mu_0}{2\pi}$ b) $\frac{\mu_0}{\pi}$ c) $\frac{3\mu_0}{2\pi}$ d) $\frac{\mu_0}{2\pi}$

15. The magnetic force on a charged particle moving in the field does not work, because

a) Kinetic energy of the charged particle does not change
b) The charge of the particle remains same
c) The magnetic force is parallel to velocity of the particle
d) The magnetic force is parallel to magnetic field

16. An infinitely long straight conductor AB is fixed and a current is passed through it. Another movable straight wire CD of finite length and carrying current is held perpendicular to it and released. Neglect weight of the wire



a) The rod CD will move upwards parallel to itself
b) The rod CD will move downward parallel to itself
c) The rod CD will move upward and turn clockwise at the same time
d) The rod CD will move upward and turn anti-clockwise at the same time

17. A wire of length 2 m carrying a current of 1 A is bent to form a circle, the magnetic moment of the coil is

a) 2π Am^2 b) $\frac{1}{\pi}$ Am^2 c) π Am^2 d) $\frac{2}{\pi}$ Am^2

18. A current flows in a conductor from east to west. The direction of the magnetic field at a point above the conductor is

a) Towards east b) Towards west c) Towards north d) Towards south

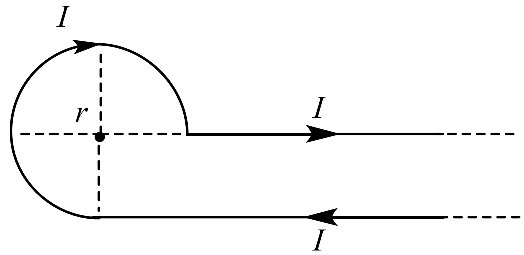
19. A particle having a mass of 10^{-2} kg carries a charge of $5 \times 10^{-8} C$. The particle is given an initial horizontal velocity of 10^5 ms^{-1} in the presence of electric field $\vec{E}$ and magnetic field $\vec{B}$. To keep the particle moving in a horizontal direction, it is necessary that

(1) $\vec{B}$ should be perpendicular to the direction of velocity and $\vec{E}$ should be along the direction of velocity
(2) Both $\vec{B}$ and $\vec{E}$ should be along the direction of velocity
(3) Both $\vec{B}$ and $\vec{E}$ are mutually perpendicular and perpendicular to the direction of velocity
(4) $\vec{B}$ should be along the direction of velocity and $\vec{E}$ should be perpendicular to the direction of velocity

Which of the following pairs of statements is possible

a) (1) and (3) b) (3) and (4) c) (2) and (3) d) (2) and (4)

20. Current I is flowing in conductor shaped as shown in the figure. The radius of the curved part is r and the length of straight portion is very large. The value of the magnetic field at the centre O will be



a) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}+1\right)$ b) $\frac{\mu_0 I}{4\pi r}\left(\frac{3\pi}{2}-1\right)$ c) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}+1\right)$ d) $\frac{\mu_0 I}{4\pi r}\left(\frac{\pi}{2}-1\right)$